

FLIGHT AND GROUND INSTRUCTOR WRITTEN TEST BOOK



U.S. Department of Transportation
Federal Aviation Administration

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**FLIGHT AND GROUND
INSTRUCTOR
WRITTEN TEST BOOK**

1991

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**
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PREFACE

This written test book has been developed by the Federal Aviation Administration (FAA) to be used by FAA testing centers and FAA designated written test examiners for testing applicants in the following knowledge areas:

- Fundamentals of Instructing
- Flight Instructor-Airplane
- Flight Instructor-Glider
- Flight **Instructor—Rotorcraft/Helicopter**
- Flight **Instructor—Rotorcraft/Gyroplane**
- Flight Instructor Additional Rating-Airplane
- Flight Instructor Additional **Rating—Rotorcraft/Helicopter**
- Flight Instructor Additional Rating-Rotorcraft/Gyroplane
- Basic Ground Instructor
- Advanced Ground Instructor

Applicants may use this written test book as a study guide. It is issued as FAA-T-8080-18, Flight and Ground Instructor Written Test Book, and is available to the public from:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402-9325

or from U.S. Government Printing Office bookstores located in major cities throughout the United States.

The questions included in this publication are predicated on regulations, references, principles, and practices that were valid at the time of publication. The question selection sheets prepared for use with this written test book are security items and are revised at frequent intervals.

The FAA does NOT publish, supply, or make available, the correct answers to questions included in this written test book. Students should determine the correct answers through research and study of appropriate subject material, by working with instructors, or by attending appropriate ground schools. The FAA is NOT responsible for either the content of commercial reprints of this written test book, or the accuracy of any answers they may supply.

Comments regarding this publication should be directed to:

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AIRCRAFT INFORMATION

GENERAL INSTRUCTIONS

MAXIMUM TIME ALLOWED FOR TEST: 4 HOURS

Maximum time allowed for each test is based upon previous experience and educational statistics. **This** time is considered more than adequate for applicants with proper preparation and instruction.

MATERIALS

Materials to be used with this written test book when used for airman certification testing:

1. AC Form 8080-3, Airman Written Test Application, which includes the answer sheet.
2. Question selection sheet which identifies the questions to be answered.
3. Plastic overlay sheet which can be placed over performance charts for plotting purposes.

TEST INSTRUCTIONS

1. Read the instructions on page 1 of AC Form 8080-3, and complete page 4 of the form. Incomplete or erroneous personal information entered on this form delays the scoring process.
2. The questions in this written test book are numbered consecutively beginning with 3001. Refer to the question selection sheet to determine which questions to answer.
3. For each question number on the answer sheet, find the appropriate question in the written test book.
4. Mark your answer in the space provided for each question number on the answer sheet. Spaces 1, 2, or 3 left unmarked will be counted by the computer scanner as a miss.
5. The test questions are of the multiple-choice type. Until revised, answer sheets contain selections listed as 1, 2, 3, and 4 and should be interpreted as A, B, and C respectively. Selection 4 should never be used.
6. The supplementary material required to answer the questions will be found in appendix 2.
7. Read each question carefully and avoid hasty assumptions. Do not answer until you understand the question. Do not spend too much time on any one question. Answer all of the questions that you readily know and then reconsider those you **find** difficult. Be careful to make necessary conversions when working with temperatures, speeds, and distances.
8. If a regulation or operations procedure is changed after this written test book is printed, you will receive credit for the affected question.

**DO NOT USE THIS BOOK UNLESS IT CORRESPONDS
WITH THE BOOK NUMBER ON THE TEST.**

THE MINIMUM PASSING GRADE IS 70.

WARNING

\$61.37 Written tests: Cheating or other unauthorized conduct.

(a) Except as authorized by the Administrator, no person may-

(1) Copy, or intentionally remove, a written test under this part;

(2) Give to another, or receive from another, any part or copy of that test;

(3) Give help on that test to, or receive help on that test from, any person during the period that test is being given;

(4) Take any part of that test in behalf of another person;

(5) Use any material or aid during the period that test is being given; or

(6) Intentionally cause, assist, or participate in any act prohibited by this paragraph.

(b) No person whom the Administrator finds to have committed an act prohibited by paragraph (a) of this section is eligible for any airman or ground instructor certificate or rating, or to take any test therefor, under this chapter for a period of 1 year after the date of that act. In addition, the commission of that act is a basis for suspending or revoking any airman or ground instructor certificate or rating held by that person.

INTRODUCTION TO THE FLIGHT AND GROUND INSTRUCTOR WRITTEN TEST BOOK

This written test book presents the FAA Flight and Ground Instructor written tests.

Question selection sheets are used in conjunction with this written test book to administer the proper written test to each applicant. Each test is constructed from the questions included in this written test book.

The written test book is scheduled for revision each 24 months. Associated question selection sheets will be revised periodically, as required.

Testing and Scoring

The written test may be taken at FAA testing centers, FAA written test examiner's facilities, or other designated places.

The applicant is issued a "clean copy" of this written test book, an appropriate question selection sheet indicating the specific questions to be answered, and AC Form 8080-3, Airman Written Test Application, which includes the answer sheet. The written test book contains all supplementary material required to answer the questions. Supplementary material is located in appendix 2.

Instructions for completing the test are contained on page vii of this written test book.

Upon completion of the test, the applicant must surrender the issued written test book, question selection sheet, answer sheet, and any papers used for computations or notations to the monitor before leaving the test room.

The answer sheet is sent to the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, where it is scored by computer. The applicant is then issued AC Form 8080-2, Airman Written Test Report. This form will list the test score and subject matter knowledge codes referencing the subjects in which the applicant is deficient. Retain AC Form 8080-2 to be presented for the practical test, or for retesting in the event of written test failure.

The written test subject matter knowledge codes are then matched to the corresponding subject matter knowledge areas published in appendix 1 of this written test book. The applicant should

review those subject areas until proficient. The applicant must obtain a written statement from an appropriately certificated flight or ground instructor stating that he/she has satisfactory knowledge of the subject areas shown to be deficient on AC Form 8080-2. In addition, the applicant may be retested in those subject areas by the pilot examiner.

The applicant should be aware that a subject matter code on AC Form 8080-2 appears only once even though more than one question may have been missed in that subject area. Therefore, the number of subject matter codes on AC Form 8080-2 may not represent the number of questions missed on the test.

When taking the test, the applicant should keep the following points in mind:

1. Answer each question in accordance with the latest regulations and procedures.
2. Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
3. After formulating an answer, determine which of the alternatives most nearly corresponds with that answer. The answer chosen should completely resolve the problem.
4. From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete or are derived from popular misconceptions.
5. If a certain question is difficult for you, it is best to proceed to other questions. After you answer the less difficult questions, return to those which gave you difficulty. Be sure to indicate on your question selection sheet the questions to which you wish to return.
6. When solving a calculator problem, select the answer nearest your solution. The problem has been checked with various types of calculators; therefore, if you have solved it correctly, your answer will be closer to the correct answer than to any of the other choices.

7. To aid in scoring, enter personal data in the appropriate spaces on the test answer sheet in a complete and legible manner. Be sure to enter the test number exactly as printed on the question selection sheet.

Retesting after Failure-FAR Section 61.49

An applicant for a written or flight test who fails that test may not apply for retesting until after 30 days after the date he failed the test. However, in the case of his first failure he may apply for retesting before the 30 days have expired upon presenting a written statement from an authorized instructor certifying that he has given flight or ground instruction as appropriate to the applicant and finds him competent to pass the test.

QUESTIONS

3001. A change in behavior as a result of experience can be defined as

- A- learning.
- B- knowledge.
- C- understanding.

3002. The learning process may include such elements as verbal, conceptual, and

- A- habitual.
- B- experiential.
- C- problem solving.

3003. While learning the material being taught, students may be learning other things as well. This additional learning is called

- A- residual.
- B- conceptual.
- C- incidental.

3004. Individuals learn best when they are willing to learn. This is a feature of the law of

- A- primacy.
- B- readiness.
- C- willingness.

3005. The law of exercise is the basis of

- A- practice and drill.
- B- correlation and performance.
- C- understanding and application.

3006. Teaching the student to perform a task right the first time is an example of the law of

- A- effect.
- B- primacy.
- C- intensity.

3007. The law that is based on the emotional reaction of the learner is the law of

- A- effect.
- B- primacy.
- C- intensity.

3008. Which law of learning implies that a student will learn more from the real thing than from a substitute?

- A- Law of effect.
- B- Law of primacy.
- C- Law of intensity.

3009. Which law of learning is recognized when an instructor carefully plans a summary for a ground school lesson or a postflight critique?

- A- Law of effect.
- B- Law of recency.
- C- Law of exercise.

3010. Which law of learning states that learning is weakened when associated with an unpleasant feeling?

- A- Law of effect.
- B- Law of primacy.
- C- Law of intensity.

3011. Things most often repeated are best remembered because of which law of learning?

- A- Law of effect.
- B- Law of recency.
- C- Law of exercise.

3012. When meaning is given to the input from the five senses, this is called

- A- sensation.
- B- perception.
- C- understanding.

3013. Which factor adversely affects students' perceptions by narrowing their perceptual field?

- A- Basic need.
- B- Physical organism.
- C- Element of threat.

3014. Perceptions result when a person

- A- groups together bits of information.
- B- gives meaning to sensations being experienced.
- C- responds to visual cues first, then aural cues, and relates these cues to ones previously learned.

3015. The factor which contributes most to a student's failure to remain receptive to new experiences and which creates a tendency to reject additional training is the student's

- A- values.
- B- basic needs.
- C- negative self-concept.

3016. Which statement is true concerning motivations?

- A- Motivations must be tangible to be effective.
- B- Motivations may be very subtle and difficult to identify.
- C- Negative motivations often are as effective as positive motivations.

3017. Motivations that cause a student to react with fear and anxiety are

- A- inverse.
- B- tangible.
- C- negative.

3018. For a motivation to be effective, students must believe their efforts will be rewarded in a definite manner. This type of motivation is

- A- subtle.
- B- negative.
- C- tangible.

3019. **Which** is generally the more effective way for the instructor to properly motivate students?

- A- Maintain pleasant personal relationships with students.
- B—** Provide positive motivations by the promise or achievement of rewards.
- C- Reinforce their self-confidence by requiring no tasks beyond their ability to perform.

3020. Motivations in the form of reproof and threats should be avoided with all but the student who is

- A- discouraged.
- B- disinterested.
- C- overconfident.

3021. The mental grouping of affiliated perceptions is called

- A- insights.
- B- association.
- C- conceptualization.

3022. An instructor may foster the development of insights by

- A- helping the student acquire and maintain a favorable self-concept.
- B- pointing out the attractive features of the activity to be learned.
- C- keeping the rate of learning consistent so that it is predictable.

3023. In the learning process, fear or the element of threat will

- A- inspire the student to improve.
- B- narrow the student's perceptual field.
- C- decrease the rate of associative reactions.

3024. Evoking student insights is one of the instructor's major responsibilities. This involves ~~the~~

- A- analysis of a student by the instructor.
- B- grouping of perceptions into meaningful wholes.
- C- student's grasp of principles as they are taught.

3025. Insights, as applied to learning, involve a person's

- A- self-concept of self-image.
- B- grouping of associated perceptions into meaningful wholes.
- C- ability to recognize the reason for learning a procedure.

3026. Instruction, as opposed to the trial and error method of learning, is desirable because competent instruction speeds the learning process by

- A- motivating the student to a better performance.
- B- emphasizing only the important points of training.
- C- teaching the relationship of perceptions as they occur.

3027. A basic need that affects all of a person's perceptions is the need to

- A- avoid areas of any threat to success.
- B- accomplish a higher level of training.
- C- enhance the person's own organized self.

3028. What is the basis of all learning?

- A- Perception.
- B- Motivation.
- C- Positive self-concept.

3029. In levels of learning, what are the steps of progression?

- A- Rote, understanding, correlation, application.
- B- Rote, understanding, application, correlation.
- C- Rote, application, understanding, correlation.

3030. The level of learning at which a person can copy a sequence of movements is

- A- rote.
- B- basic.
- C— initiative.

3031. The level of learning at which the student becomes able to associate an element which has been learned with other blocks of learning is

- A- application.
- B- association.
- C- correlation.

3032. A basic motivation for all human endeavor is the desire

- A- of achievement.
- B- for personal gain.
- C- for personal comfort.

3033. The best way to prepare a student to perform a task is to

- A- provide a clear, step-by-step example.
- B- give the student an outline of the task.
- C- lead the student very slowly through the task.

3034. The performance of rectangular patterns helps a student fly traffic patterns. What type of transfer of learning is this?

- A- Lateral.
- B- Positive.
- C- Concomitant.

3035. On a graph showing the typical progress in learning, the initial leveling off of the learning curve is called a

- A- learning reverse.
- B- learning plateau.
- C- learning level-off.

3036. A primary consideration in planning for student performance is the

- A- student's motivational level.
- B- student's intellectual level.
- C— length of the practice session.

3037. Which transfer of learning occurs when the performance of a maneuver interferes with the learning of another maneuver?

- A- Adverse.
- B- Positive.
- C- Negative.

3038. According to one theory, some forgetting is due to the practice of submerging an unpleasant experience into the subconscious. This is called

- A- blanking.
- B- repression.
- C- interference.

3039. When the learning of similar things overshadows other learning experiences, it is called

- A- correlation.
- B- interference.
- C- interruption.

3040. Factual data that is lost from conscious memory after several years is lost due to

- A- disuse.
- B- distancing.
- C— interference.

3041. Responses that produce a pleasurable return are called

- A- reward.
- B- praise.
- C- positive feedback.

3042. To ensure proper habits and correct techniques during **training**, an instructor should

- A - use the building block technique of instruction.
- B- always repeat subject matter the student has already learned.
- C- introduce tasks which are difficult and challenging to the student.

3043. Which of the student's human needs offers the greatest challenge to the instructor?

- A- Social.
- B- Egoistic.
- C- Self-fulfillment.

3044. After individuals are physically comfortable and have no fear for their safety, which human need then becomes the prime influence on their behavior?

- A- Social.
- B- Physical.
- C- Egoistic.

3045. Before a student can concentrate on learning, which of the human needs must be satisfied?

- A- Social.
- B- Safety.
- C- Physical.

3046. Among the various human needs, which is the individual concerned about first?

- A- Safety.
- B- Security.
- C- Physical.

3047. Although defense mechanisms can serve a useful purpose, they can also be a hindrance because they

- A- provide feelings of adequacy.
- B- alleviate the cause of problems.
- C- involve self-deception and distortion of reality.

3048. When a student asks irrelevant questions or refuses to participate in class activities, it usually is an indication of the defense mechanism known as

- A- flight.
- B- aggression.
- C- resignation.

3049. Taking physical or mental flight is a defense mechanism that students use when they

- A- want to escape from frustrating situations.
- B- cannot accept the real reasons for their behavior.
- C- become bewildered and lost in the advanced phase of training.

3050. When a student uses excuses to justify inadequate performance, it is an indication of the defense mechanism known as

- A- flight.
- B- aggression.
- C- rationalization.

3051. When students subconsciously use the defense mechanism called rationalization, they

- A- use excuses to justify acceptable behavior.
- B- cannot accept the real reasons for their behavior.
- C- develop symptoms that give them excuses for removing themselves from frustration.

3052. When students become so frustrated they no longer believe it profitable or even possible to work further, they usually display which defense mechanism?

- A- Aggression.
- B- Resignation.
- C- Rationalization.

3053. **When** a student becomes bewildered and lost in the advanced phase of training after completing the early phase without grasping the fundamentals, the defense mechanism is usually in the form of

- A- passivity.
- B- resignation.
- C- rationalization.

3054. When students display the defense mechanism called aggression, they

- A- become visibly angry, upset, and childish.
- B- may refuse to participate in the activities of the class.
- C- attempt to justify actions that otherwise would be unacceptable.

3055. When a student engages in daydreaming, it is the defense mechanism of

- A- flight.
- B- fantasy.
- C- avoidance.

3056. Which would more likely result in students becoming frustrated?

- A- Giving the students praise too freely.
- B- Telling the students that their work is unsatisfactory with no explanation.
- C- Covering up instructor mistakes or bluffing when the instructor is in doubt.

3057. When students are unable to see the benefits or purpose of a lesson, they will

- A- be more frustrated.
- B- want to learn more.
- C- be further motivated.

3058. When the instructor keeps the student informed of lesson objectives and completion standards, it minimizes the student's

- ~~A—~~ insecurity.
- B- motivation.
- C- aggressiveness.

3059. Student confidence tends to be destroyed if instructors

- A- bluff whenever in doubt about some point.
- B- identify the student's errors and failures.
- C- direct and control the student's actions and behavior.

3060. Instructors who limit their thinking to the whole group without considering the individuals within that group are

- A- using a good lecture technique.
- B- using an excellent timesaving measure.
- C- assuming all students have an average personality.

3061. The effectiveness of communication between the instructor and the student is measured by the

- A- degree of motivation manifested by the student.
- B- similarity between the idea transmitted and the idea received.
- C- degree of attention the student gives to the instructor during a lesson.

3062. Successful communicators speak or write from a background of

- A- specialized experience,
- B- up-to-date, stimulating material.
- C- specialized education in effective communication.

3063. To communicate effectively, instructors must

- A- have highly organized notes.
- B- be authoritarian to keep the student's attention.
- C- reveal a positive and confident attitude while delivering their message.

3064. Effective communication, during student instruction, has taken place when

- A- information is transmitted and received.
- B- the student is able to repeat the information that has been received.
- ~~C—~~ information is provided in such a way that it changes the behavior of the student.

3065. Effective communication has taken place when, and only when, the

- A- receivers react with understanding and change their behavior accordingly.
- B- receiver has the ability to question and comprehend the ideas that have been transmitted.
- C- sender uses a vocabulary (written or oral) that is meaningful to the reader or listener.

3066. In the communication process, the communicator will be more successful in gaining and retaining the receiver's attention by

- A- being very friendly.
- B- lecturing without audiovisual aids.
- C- using a varied communicative approach.

3067. By the use of abstractions in the communication process, the communicator will

- A- bring forth specific items of experience in the minds of the receivers.
- B- be using words which refer to objects or ideas that human beings can experience directly.
- C- not evoke in the listener's or reader's mind the specific items of experience the communicator intends.

3068. The danger in using abstract words is that they

- A- control the image produced in the listener's mind.
- B- call forth different mental images in the minds of the receivers.
- C- will not evoke the specific items of experience in the listener's mind that the communicator intends.

3069. Probably the greatest single barrier to effective communication is the

- A- use of abstractions by the communicator.
- B- use of statements which contain inaccuracies.
- C- lack of a common core of experience between communicator and receiver.

3070. Probably the greatest single barrier to effective communication in the teaching process is a lack of

- A- respect for the instructor.
- B- personality harmony between instructor and student.
- C- a common experience level between the instructor and student.

3071. A communicator's words cannot communicate the desired meaning to another person unless the

- A- words have meaningful referents.
- B- words give the meaning that is in the mind of the receiver.
- C- listener or reader has had some experience with the objects or concepts to which these words refer.

3072. What is the proper sequence in which the instructor should employ the four basic steps in the teaching process?

- A- Explanation, trial and practice, evaluation, and review.
- B- Explanation, demonstration, practice, and evaluation.
- C- Preparation, presentation, application, and review and evaluation.

3073. Which method of presentation is desirable for teaching a skill such as cross-country planning?

- A- Integrated instruction.
- B- Demonstration/performance.
- C- Presentation and application.

3074. In the teaching process, which method of presentation is suitable for presenting new material, for summarizing ideas, and for showing relationships between theory and practice?

- A- Lecture method.
- B- Integrated instruction method.
- C- Demonstration/performance method.

3075. Evaluation of student performance and accomplishment during a lesson should be based on the

- A- student's background and past experiences.
- B- objectives and goals that were established in the lesson plan.
- C- student's actual performance as compared to an arbitrary standard.

3076. To enhance a student's acceptance of further instruction, the instructor should

- A- keep the student informed of the progress made.
- B- continually prod the student to maintain motivational levels.
- C- establish performance standards a little above the student's actual ability.

3077. Which statement is true regarding student evaluation?

- A- The student's own evaluations can only be objective.
- B- Evaluation of the student's learning should be an integral part of each lesson.
- C- If deficiencies or faults not associated with the present lesson are revealed, they should be ignored and corrected at a later date.

3078. The method of arranging lesson material from the simple to complex, past to present, and known to unknown, is one that

- A- creates student thought pattern departures.
- B- shows the relationships of the main points of the lesson.
- C- requires students to actively participate in the lesson.

3079. The proper sequence for the subparts of an introduction is

- A- attention, motivation, and overview.
- B- attention, development, and overview.
- C- overview, motivation, and conclusion.

3080. When teaching from the known to the unknown, an instructor is using the student's

- A- anxieties and insecurities.
- B- previous experiences and knowledge.
- C- previously held opinions both valid and invalid.

3081. In organizing lesson material, which step should relate the coverage of material to the entire course?

- A- Overview.
- B- Conclusion.
- C- Introduction.

3082. In developing a lesson, the instructor must logically organize explanations and demonstrations to help the student

- A- understand the separate items of knowledge.
- B- understand the relationships of the main points of the lesson.
- C- learn by rote so that performance of the procedure will become automatic.

3083. The first step in preparing a lecture is to

- A- research the subject.
- B- develop the main ideas or key points.
- C- establish the objective and desired outcome.

3084. During a teaching lecture, what would detract from an instructor's dignity and reflect upon the student's intelligence?

- A- Use of abstractions.
- B- Using picturesque slang.
- C- Errors in grammar and vulgarisms.

3085. What is one advantage of a lecture?

- A- It provides for student participation.
- B- Many ideas can be presented in a short time.
- C- It provides the instructor with an accurate means of monitoring student learning.

3086. When it appears students have adequately discussed the ideas presented during a guided discussion, one of the most valuable tools an instructor can use is

- A- a session of verbal testing.
- B- a written test on the subject discussed.
- C- an interim summary of what the students accomplished.

3087. In a guided discussion, **leadoff** questions should usually begin with

- A- why.
- B- what.
- C- when.

3088. Learning is produced in a guided discussion through the skillful use of

- A- questions.
- B- explanations.
- C- demonstrations.

3089. Which statement about the guided discussion method of teaching is true?

- A- Students do not need to be aware of the lesson objective.
- B- Students without a background in the subject should be included in the discussion.
- C- Unless the students have some knowledge to exchange with each other, they cannot reach the desired learning outcomes.

3090. Which question would be best as a **leadoff** question for a guided discussion on the subject of torque?

- A- Does torque affect the airplane?
- B- How does torque affect the airplane?
- C- Does torque cause the airplane to turn?

3091. In preparing questions for a guided discussion, the instructor should remember that the purpose is to

- A- develop the student's verbal abilities.
- B- evaluate and grade the student's knowledge.
- C- bring about discussion to develop an understanding of the subject.

3092. In a guided discussion, learning is produced through

- A- the skillful use of questions.
- B- explanations and demonstrations.
- C- discussion of a topic in which students have little or no background.

3093. Which type question should an instructor use to begin a guided discussion with a group of students?

- A- Relay.
- B- Direct.
- C- Overhead.

3094. In the demonstration/performance method of instruction, which two separate actions are performed concurrently?

- A- Instructor demonstration and evaluation.
- B- Student performance and instructor supervision.
- C- Instructor explanation and student demonstration.

3095. What is the last step in the demonstration/performance method?

- A- Evaluation.
- B- Demonstration.
- C- Student performance.

3096. What are the essential steps in the demonstration/performance method of teaching?

- A- Demonstration, practice, and evaluation.
- B- Demonstration, student performance, and evaluation.
- C- Explanation, demonstration, student performance, instructor supervision, and evaluation.

3097. The instructor can best inspire active student participation in informal lectures through the use of

- A- questions.
- B- visual aids.
- C- negative motivations.

3098. The distinguishing characteristic of an informal lecture is the

- A- use of visual aids.
- B- student's participation.
- C- requirement for detailed notes.

3099. Which teaching method is particularly suitable for introducing a subject and is the most economical in terms of the time required to present a given amount of material?

- A- Lecture.
- B- Briefing.
- C- Demonstration.

3100. Which is a true statement regarding the teaching lecture?

- A- Delivering the lecture in an extemporaneous manner is not recommended.
- B- The teacher receives direct reaction from the student in the form of verbal or motor activity.
- C- The instructor must develop a keen perception for subtle responses and must be able to interpret the meaning of these reactions.

3101. Which statement is true about an instructor's critique of a student's performance?

- A- It is a step in the learning process, not in the grading process.
- B- The critique should be subjective rather than objective in nature.
- C- The instructor's comments and recommendations should be general rather than specific.

3102. Which statement is true about instructors' critiques?

- A- A comprehensive critique must treat every aspect of the student's performance in detail.
- B—** Instructors should rely on their position to make a critique more acceptable to their students.
- C- Before students willingly accept their instructor's critique, they must first accept the instructor.

3103. The purpose of a critique is to

- A—** identify only the student's faults and weaknesses.
- B- give the students a delayed evaluation of their performance.
- C- provide direction and guidance to raise the level of the student's performance.

3104. When an instructor critiques a student, it should always be

- A- done in private.
- B- subjective rather than objective.
- C- conducted immediately after the student's performance.

3105. An instructor's critique of a student's performance should

- A- treat every aspect of the performance in detail.
- B- be private so that the student is not embarrassed.
- C- provide direction and guidance to improve performance.

3106. Which statement is true about an instructor's critique of a student's performance?

- A- Praise for praise's sake is of value.
- B- It should be constructive and objective.
- C - It should treat every aspect of the performance in detail.

3107. To be effective, a critique should

- A- place more emphasis on a student's weaknesses.
- B- treat every aspect of the performance in detail.
- C- be flexible enough to satisfy the requirements of the moment.

3108. When conducting a critique, the instructor should

- A- praise the student before criticizing, even if undeserved.
- B- emphasize the points covered with dogmatic and absolute statements.
- C- cover only a few well-made points rather than a large number of inadequately developed points.

3109. Which is a valid reason for the use of proper oral quizzing during a lesson?

- A- Promotes active student participation.
- B- Identifies points that need less emphasis.
- C- Helps the instructor determine the general intelligence level of the students.

3110. During oral quizzing in a given lesson, effective questions should

- A- be brief and concise.
- B- relate to more than one thought or idea.
- C- divert the student's thoughts to subjects covered in previous lessons.

3111. In all quizzing as a portion of the instruction process, the questions should

- A- include catch questions to develop the student's perceptive power.
- B- call for specific answers and be readily evaluated by the instructor.
- C- include questions with more than one central idea to evaluate how completely a student understands the subject.

3112. Proper quizzing by the instructor during a lesson can have which result?

- A- Identifies points which need more emphasis.
- B- Encourages rote responses from the students.
- C- Permits the introduction of new material which was not covered previously.

3113. One desirable result of proper oral quizzing by the instructor is to

- A- reveal the effectiveness of the instructor's training procedures.
- B- fulfill the requirements set forth in the overall objectives of the course.
- C- reveal the essential information from which the student can determine progress.

3114. To be effective in oral quizzing during the conduct of a lesson, a question should

- A- center on only one idea.
- B- include a combination of where, how, and why.
- C- divert the student's thoughts to subjects covered in other lessons.

3115. To answer a student's question, it is most important that the instructor

- A- clearly understand the question.
- B- have complete knowledge of the subject.
- C- introduce more complicated information to fully answer the question.

3116. Which type of test item creates the greatest probability of guessing?

- A- True-false.
- B- Association.
- C- Multiple choice.

3117. Which is the main disadvantage of **supply**-type (essay) test items?

- A- Their high level of objectivity.
- B- They cannot be graded with uniformity.
- C- They are readily answered by guessing.

3118. The characteristic of a written test, which measures small differences in achievement between students, is its

- A- validity.
- B- reliability.
- C- discrimination.

3119. A written test has validity when it

- A- yields consistent results.
- B- samples liberally whatever is being measured.
- C- actually measures what it is supposed to measure and nothing else.

3120. Which principle should be followed in the development of true-false tests?

- A- Include complex statements in the questions.
- B- Avoid absolutes such as "all," "every," and **"only."**
- C- Include one or more ideas in each statement in the questions.

3121. What is a characteristic of supply-type (essay) test items?

- A- They are well adapted to the testing of knowledge of facts and details.
- B- Test results would be graded the same regardless of the student or the grader.
- C- The same test graded by different instructors would probably be given different scores.

3122. When a written test shows positive discrimination, it will

- A- sample liberally what is being measured.
- B- include a representative and comprehensive sampling of the course objectives.
- C- distinguish between the students who are low and those who are high in achievement.

3123. A written test is said to be comprehensive when it

- A- includes all levels of difficulty.
- B- samples liberally whatever is being measured.
- C- measures knowledge of the same topic in many different ways.

3124. A written test which has reliability

- A- yields consistent results.
- B- measures small differences in the achievement of students.
- C- actually measures what it is supposed to measure and nothing else.

3125. One of the main advantages of selection-type (multiple-choice) test items over supply-type (essay) test items is that the selection-type

- A- measures the student's generalized understanding of a subject.
- B- would be graded objectively regardless of the student or the grader.
- C- precludes comparison of students under one instructor with those of another instructor.

3126. Which statement is true relative to effective multiple-choice test items?

- A- Negative words or phrases need not be emphasized.
- B- Items should call for abstract background knowledge.
- C- Keep all alternatives of approximately equal length.

3127. Which is one of the major difficulties encountered in the construction of multiple-choice test items?

- A- Adapting the items to statistical item analysis.
- B- Keeping all responses approximately equal in length.
- C- Inventing **distractors** which will be attractive to students lacking knowledge or understanding.

3128. Which statement is true about **multiple-choice** test items that are intended to measure achievement at a higher level of learning?

- A- Responses involving numbers should be randomized.
- B- Some or all of the alternatives should be nearly correct but only one should be clearly correct.
- C- The use of common errors as distracting alternatives to divert the student **from** the correct response is ineffective and invalid.

3129. In a written test, which type of test items makes it easier to compare the performance of students within the same class or in different classes?

- A- Supply.
- B- Selection.
- C- True-false.

3130. Which type test is desirable for evaluating training that involves an operation, procedure, or process?

- A- Oral.
- B- Written.
- C- Performance.

3131. Which is a true statement concerning the use of visual aids?

- A- Visual aids ensure getting and holding the student's attention.
- B- Visual aids can be used to emphasize the key points in a lesson.
- C- Visual aids should not be used to cover a subject in less time.

3132. Instructional aids used in the teaching/learning process should be

- A- self-supporting and should require no explanation.
- B- compatible with the learning outcomes to be achieved.
- C- selected prior to developing and organizing the lesson plan.

3133. Instructional aids used in the teaching/learning process should not be used

- A- to concentrate on key points.
- B- as a crutch by the instructor.
- C- for teaching more in less time.

3134. The use of instructional aids should be based on their ability to support a specific point in the lesson. What is the first step to determine if and where instructional aids are necessary?

- A- Organize subject material into an outline or a lesson plan.
- B- Decide at what point in the lesson the student's interest must be rekindled.
- C- Clearly establish the lesson objective, being certain what must be communicated.

3135. An instructor cannot retain the reputation of a professional if that person

- A- is not paid what he or she is worth.
- B- is calm, thoughtful, and disciplined.
- C- does anything which implies degrading the student.

3136. The professional relationship between the instructor and the student should be based upon

- A- the need to disregard the student's personal faults, interests, or problems.
- B- setting the learning objectives very high so that the student is challenged continually.
- C— the mutual acknowledgment that they are important to each other and both are working toward the same objective.

3137. Which statement is true regarding true professionalism as an instructor?

- A- Anything less than sincere performance destroys the effectiveness of the professional instructor.
- B- To achieve professionalism, actions and decisions must be limited to standard patterns and practices.
- C- A single definition of professionalism would encompass all of the qualifications and considerations which must be present.

3138. An instructor can most effectively maintain a high level of student motivation by

- A- making each lesson a pleasurable experience.
- B- grading on a curve so most of the students are able to pass the course.
- C- continually challenging the student to meet the highest objectives of training that can be established.

3139. What should an instructor do with a student who assumes that correction of errors is unimportant?

- A- Divide complex flight maneuvers into their elements.
- B- Try to reduce the student's overconfidence to reduce the chance of an accident.
- C- Raise the standard of performance for each lesson, demanding greater effort.

3140. **What** should an instructor do if a student's slow progress is due to discouragement and a lack of confidence?

- A- Provide unlimited help and encouragement.
- B- Assign subgoals which can be attained more easily than the normal learning goals.
- C- Raise the performance standards so that the student will gain satisfaction in meeting higher standards.

3141. Which statement is true regarding the achievement of an adequate standard of performance?

- A- A flight instructor should devote major effort and attention to the continuous evaluation of student performance.
- B- Flight instructors will effect a genuine improvement in the student/instructor relationship by lowering standards.
- C- Flight instructors fail to provide competent instruction when they permit their students to partially learn an important item of knowledge or skill.

3142. Which statement is true regarding positive or negative approaches in aviation instructional techniques?

- A- A positive approach, to be effective, will point out the pleasurable features of aviation before the unpleasant possibilities are discussed.
- B- The introduction of emergency procedures before the student is acquainted with normal operations is neither likely to be discouraging nor affect learning.
- C- A student with a good self-image will not be affected by an instructor who emphasizes the critical aspects of flying early in training.

3143. Which is an example of a positive approach in the first flight lesson of a student with no previous aviation experience?

- A- A series of simulated forced landings.
- B- A normal flight to a nearby airport and return.
- C- Instruction in the care which must be taken when taxiing an airplane.

3144. Should an instructor be concerned about an apt student who makes very few mistakes?

- A- No; some students have an innate, natural aptitude for flying well.
- B- Yes; faulty performance may soon appear due to student overconfidence.
- C- Yes; the student will lose confidence in the instructor unless the instructor invents deficiencies in the student's performance.

3145. Faulty performance due to student overconfidence should be corrected by

- A- increasing the standard of performance for each lesson.
- B- praising the student only when the performance is perfect.
- C- providing strong, negative evaluation at the end of each lesson.

3146. If a student's progress is slow due to discouragement and a lack of confidence, the instructor should

- A- provide unlimited help and encouragement.
- B- accept the slow rate of progress and accept a substandard performance.
- C- have the student practice elements of the task involved until confidence and ability are gained.

3147. When a student correctly understands the situation and knows the correct procedure for the task, but fails to act at the proper time, the student most probably

- A- lacks self-confidence.
- B- is handicapped by indifference or lack of interest.
- C- feels that the instructor is making unreasonable demands for performance and progress.

3148. What should an instructor do if a student is suspected of not fully understanding the principles involved in a task, even though the student can correctly perform the task?

- A- Do not require the student to vary the performance of the maneuver at all.
- B- Require the student to apply the same elements to the performance of other tasks.
- C- Take the controls away from the student and give a demonstration on the practical application of the principles involved in the task.

3149. When under stress, normal individuals usually react

- A- with very rapid changes in emotions, severe anger at the instructor, or others.
- ~~B—~~ by responding rapidly and exactly, often automatically, within the limits of their experience and training.
- C- inappropriately such as extreme overcooperation, painstaking self-control, and inappropriate laughing or singing.

3150. One possible indication of a student's abnormal reaction to stress would be

- A- a hesitancy to act.
- B- extreme overcooperation.
- C- very slow changes in emotions.

3151. The instructor can counteract anxiety in a student by

- A- treating the student's fears as a normal reaction.
- B- discontinuing instruction in tasks that cause anxiety.
- C- allowing the student to decide when he/she is ready for a new maneuver to be introduced.

3152. Which would most likely be an indication that a student is reacting abnormally to stress?

- A- Slow learning.
- B- Inappropriate laughter or singing.
- C- Automatic response to a given situation.

3153. The basic demonstration/performance method of instruction consists of several steps in proper order. They are

- A- instructor tells-student does; student tells-student does; student does--instructor evaluates.
- B- instructor tells-instructor does; student tells-instructor does; student does-instructor evaluates.
- ~~C—~~ instructor tells-instructor does; student tells-instructor does; student tells-student does; student does-instructor evaluates.

3154. The objective of integrated flight instruction is to

- A- correlate the ground and flight training curriculums.
- B- help the student develop habit patterns for observance of and reliance on flight instruments.
- C- ensure that the student is not overly dependent on the instruments during VFR flight.

3155. The primary objective of integrated flight instruction is the

- A- formation of firm habit patterns for observing and relying on flight instruments.
- B- difference in the pilot's operation of the flight controls in VFR and IFR conditions.
- C- developing of the habit of occasionally monitoring their own and the aircraft's performance.

3156. Which is an acceptable procedure when using the integrated method of flight instruction?

- A- Use alternate and distinct periods devoted entirely to instrument flight or to visual flight.
- B- Prior to the first flight, clearly explain the differences in the manipulation of flight controls for maintaining aircraft control when under simulated instrument conditions and when using references outside the aircraft.
- C- Include in the student's first instruction on the function of flight controls the instrument indication to be expected, as well as the outside references used in attitude control.

3157. During integrated flight instruction, the instructor must be sure that the students

- A- develop the habit of looking for other traffic.
- B- can depend on the flight instruments when maneuvering by outside references.
- C- are able to control the aircraft for extended periods if outside references are lost.

3158. Which obstacle to learning is a greater deterrent to learning pilot skills than is generally recognized?

- A- Anxiety.
- B- Impatience.
- C- Physical discomfort.

3159. What is the primary consideration in determining the length and frequency of flight instruction periods?

- A- Anxiety.
- B- Fatigue.
- C- Mental acuity.

3160. Students quickly become apathetic when they

- A- are assigned goals that are difficult but possible.
- B- understand the objectives toward which they are working.
- C- recognize that the instructor is inadequately prepared.

3161. Students who grow impatient when learning the basic elements of a task are those who

- A- are less easily discouraged than the unaggressive students.
- B- should have the preliminary training presented one step at a time with clearly stated goals for each step.
- C- should not be held back by insisting that the immediate goal be reached before they progress to the next step in training.

3162. Which is one of the ways in which anxiety or apprehension will affect a student?

- A- Anxiety may limit the student's ability to learn from perceptions.
- B- Anxiety will speed up the learning process for the student if properly controlled and directed by the instructor.
- C- Anxiety causes dispersal of the student's attention over such a wide range of matters as to interfere with normal reactions.

3163. Which statement is true concerning extraneous blocks of instruction during a course of training?

- A- They are usually necessary parts of the total objective.
- B- They detract from the completion of the final objective.
- C- They assist in the attainment of the lesson's objective.

3164. Development and assembly of blocks of learning in their proper relationship will provide a means for

- A- both the instructor and student to easily correct faulty habit patterns.
- B—** challenging the student by progressively increasing the units of learning.
- C- allowing the student to master the segments of the overall pilot performance requirements individually and combining these with other related segments.

3165. In planning any instructional activity, the first consideration should be to

- A- determine the overall objectives and standards.
- B- establish common ground between the instructor and student.
- C—** identify the blocks of learning which make up the overall objective.

3166. Each lesson of the training syllabus includes

- A- attention, motivation, and overview.
- B- introduction, development, and conclusion.
- C- objective, content, and completion standards.

3167. In planning instructional activity, the second step is to

- A- establish the overall objectives and standards.
- B- develop lesson plans for each period or unit of instruction.
- C—** identify the blocks of learning which constitute the necessary parts of the total objective.

3168. When it is impossible to conduct a scheduled lesson, it is preferable for the instructor to

- A- revise the lesson objective.
- B- proceed to the next scheduled lesson, or if this is not practical, cancel the lesson.
- C- conduct a lesson that is not predicated completely on skills to be developed during the lesson which was postponed.

3169. Which statement is true regarding lesson plans?

- A- The rigid use of prepared lesson plans for all students is most effective.
- B—** Lesson plans should not be directed toward the course objective; only to the lesson objective.
- C- Lesson plans help instructors keep a constant check on their own activity as well as that of their students.

3170. With regard to the characteristics of a well-planned lesson, each lesson should contain

- A- one very basic element of a simple principle, procedure, or skill.
- B—** new material that is related to the lesson previously presented.
- C- every bit of information needed to reach the objective of the training syllabus.

3171. In developing a lesson plan for an in-flight lesson on ground reference maneuvers, which would correctly state the true objective of the lesson?

- A- "To cover the principles of planning and following a pattern. . . ."
- B—** "To develop the student's skill in planning and following a pattern. . . ."
- C—** "To explain and demonstrate the principles of planning and following a pattern. . . ."

3172. Which statement is true about lesson plans?

- A- An effective lesson plan may be only a mental outline.
- B—** The use of a rigidly prepared lesson plan should be used for an instructional flight.
- C- The lesson should contain new facts, principles, procedures, or skills related to a previous lesson.

3173. If lesson plans are constructed in a proper manner, they will provide an outline for

- A- proceeding from the unknown to the known.
- B—** blocks of learning that become progressively larger in scope.
- C- the teaching procedure to be used in a single instructional period.

3174. (Refer to figure 1.) Section F is titled:

- A- Application.
- B- Understanding.
- C- Student's Actions.

3175. (Refer to figure 1.) Section A is titled:

- A- Overview.
- B- Objective.
- C- Introduction.

3176. (Refer to figure 1.) Section B is titled:

- A- Elements.
- B- Blocks of Learning.
- C- Course of Training.

3177. (Refer to figure 1.) Section G is titled:

- A- Summary.
- B- Evaluation.
- C- Completion Standards.

3178. (Refer to figure 1.) Section E is titled:

- A- Content.
- B- Discussion.
- C- Instructor's Actions.

3179. (Refer to figure 1.) Section C is titled:

- A- Overview.
- B- Schedule.
- C- Training Schedule.

3180. (Refer to figure 1.) Section D is titled:

- A- Apparatus.
- B- Equipment.
- C- Preparation.

3181. The layer of the atmosphere typified by relatively small changes in temperature with increased height, except for a warming trend near the top, is the

- A- tropopause.
- B- troposphere.
- C- stratosphere.

3182. In what part of the atmosphere does most weather occur?

- A- Tropopause.
- B- Troposphere.
- C- Stratosphere.

3183. The height of the tropopause over the contiguous 48 states is

- A- relatively constant.
- B- lower in the winter.
- C- lower in the summer.

3184. The tropopause is the dividing line between the

- A- troposphere and ionosphere.
- B- ionosphere and stratosphere.
- C- troposphere and stratosphere.

3185. Which is the primary driving force of weather on the Earth?

- A- The Sun.
- B- Coriolis.
- C- Rotation of the Earth.

3186. The average lapse rate in the troposphere is

- A- 2.0' C per 1,000 feet.
- B- 3.0' C per 1,000 feet.
- C- 5.4" C per 1,000 feet.

3187. The most frequent type of ground- or surface-based temperature inversion is that produced by

- A- terrestrial radiation on a clear, relatively still night.
- B- warm air being lifted rapidly aloft in the vicinity of mountainous terrain.
- C- the movement of colder air under warm air or the movement of warm air over cold air.

3188. Which weather conditions should be expected beneath a low-level temperature inversion layer when the relative humidity is high?

- A- Light wind shear and poor visibility due to light rain.
- B- Smooth air and poor visibility due to fog, haze, or low clouds.
- C- Turbulent air and poor visibility due to fog, low stratus type clouds, and showery precipitation.

3189. If the air temperature is **+6 °C** at an elevation of 700 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

- A- 6,700 feet MSL.
- B- 3,700 feet MSL.
- C- 2,700 feet MSL.

3190. If the air temperature is **+12 °C** at an elevation of 1,250 feet and a standard (average) temperature lapse rate exists, what will be the approximate freezing level?

- A- 7,250 feet MSL.
- B- 5,250 feet MSL.
- C- 4,250 feet MSL.

3191. An altimeter indicates 1,850 feet MSL when set to 30.18. What is the approximate pressure altitude?

- A- 1,590 feet.
- B— 1,824 feet.**
- C- 2,110 feet.

3192. An aircraft is flying at a constant power setting and a constant indicated altitude. If the outside air temperature (OAT) increases, true airspeed will

- A- increase and true altitude will decrease.
- B- increase and true altitude will increase.
- C- decrease and true altitude will increase.

3193. Density altitude may be determined by correcting

- A- true altitude for nonstandard temperature.
- B- pressure altitude for nonstandard temperature.
- C- indicated altitude for temperature variations.

3194. What are the standard temperature and pressure values for mean sea level?

- A- 15 °F and 29.92" Hg.
- B- 59 °C and 29.92 mb.
- C- 59 °F and 1013.2 mb.

3195. What causes wind?

- A- Coriolis force.
- B- Pressure differences.
- C- The rotation of the Earth.

3198. The **windflow** around a low pressure is

- A- cyclonic.
- B- adiabatic.
- C- anticyclonic.

3197. Winds at 5,000 feet AGL on a particular flight are southwesterly while most of the surface winds are southerly. This difference in direction is primarily due to

- A- local terrain effects on pressure.
- B- stronger Coriolis force at the surface.
- C- friction between the wind and the surface.

3198. In the Northern Hemisphere, a pilot making a long distance flight from east to west would most likely **find** favorable winds associated with **high-** and low-pressure systems by flying to the

- A- north of a high and a low.
- B- north of a high and to the south of a low.
- C- south of a high and to the north of a low.

3199. When flying from a high- to a low-pressure area in the Northern Hemisphere, the wind direction and velocity will be from the

- A- left and increasing.
- B- left and decreasing.
- C- right and increasing.

3299. The general circulation of air associated with a high-pressure area in the Northern Hemisphere is

- A— inward, upward, and clockwise.**
- B- outward, downward, and clockwise.
- C- outward, upward, and counterclockwise.

3201. Which statement is true regarding high- or low-pressure systems?

- A- A high-pressure area or ridge is an area of rising air.
- B- A low-pressure area or trough is an area of rising air.
- C- A high-pressure area is a trough of descending air.

3202. Which is an operational consideration regarding actual air temperature and **dewpoint** temperature spread?

- A- The temperature spread decreases as the relative humidity decreases.
- B- The temperature spread decreases as the relative humidity increases.
- C- The temperature spread increases as the relative humidity increases.

3203. The ratio of the existing water vapor in the air, as compared to the maximum amount that could exist at a given temperature, is called

- A- the dewpoint.
- B- saturation point.
- C- relative humidity.

3204. What is the process by which ice can form on a surface directly from water vapor on a cold, clear night?

- A- Sublimation.
- B- Condensation.
- C- Supersaturation.

3205. Which precipitation type usually indicates freezing rain at higher altitudes?

- A- Snow.
- B- Hail.
- C- Ice pellets.

3206. When warm air moves over a cold lake, what weather phenomenon is likely to occur on the leeward side of the lake?

- A- Fog.
- B- Showers.
- C- Cloudiness.

3207. Streamers of precipitation trailing beneath clouds but evaporating before reaching the ground are known as

- A- virga.
- B- sublimation.
- C- evaporative.

3208. From which measurement of the atmosphere can stability be determined?

- A- Ambient lapse rate.
- B- Atmospheric pressure.
- C- Difference between standard temperature and surface temperature.

3209. The formation of either predominantly stratiform or predominantly cumuliform clouds is dependent upon the

- A- source of lift.
- B- stability of the air being lifted.
- C- percent of moisture content of the air being lifted.

3210. The airport elevation is 1,294 feet MSL. At what elevation above mean sea level would you expect cumuliform clouds if the surface air temperature is 26 °C and the **dewpoint** is 21 °C?

- A- 2,000 feet MSL.
- B- 3,136 feet MSL.
- C- 3,294 feet MSL.

3211. At approximately what altitude above the surface would you expect the base of cumuliform clouds if the surface air temperature is 77 °F and the **dewpoint** is 53 °F?

- A- 9,600 feet AGL.
- B- 8,000 feet AGL.
- C- 5,500 feet AGL.

3212. At approximately what altitude above the surface would you expect the base of cumuliform clouds if the surface air temperature is 33 °C and the **dewpoint** is 15 °C?

- A- 4,100 feet AGL.
- B- 6,000 feet AGL.
- C- 7,200 feet AGL.

3213. If clouds form as a result of very stable, moist air being forced to ascend a mountain slope, the clouds will be

- A- cirrus type with no vertical development or turbulence.
- B- cumulonimbus with considerable vertical development and heavy rains.
- C- stratus type with little vertical development and little or no turbulence.

3214. The height of the bases of the middle clouds in the middle latitudes ranges from

- A - 1,000 to 10,000 feet.
- B - 6,500 to 23,000 feet.
- C - 16,500 to 45,000 feet.

3215. Which middle level clouds are characterized by rain, snow, or ice pellets posing a serious icing problem if temperatures are near or below freezing?

- A- Nimbostratus.
- B- Altostratus lenticular.
- C- Altocumulus **castellanus**.

3216. Consider the following air mass characteristics:

1. Cumuliform clouds.
2. Stable lapse rate.
3. Unstable lapse rate.
4. Stratiform clouds and fog.
5. Smooth air (above the friction level) and poor visibility.
6. Turbulence up to about 10,000 feet and good visibility except in areas of precipitation.

A moist air mass, which is colder than the surface over which it passes, frequently has which of the above characteristics?

- A - 1, 3, and 6.
- B - 3, 4, and 5.
- C - 2, 4, and 5.

3217. The weather condition normally associated with unstable air is

- A- stratiform clouds.
- B- fair to poor visibility.
- C- good visibility, except in blowing sand or snow.

3218. A moist, unstable air mass is characterized **by**

- A- poor visibility and smooth air.
- B- cumuliform clouds and showery precipitation.
- C- stratiform clouds and continuous precipitation.

3219. What type weather is associated with an advancing warm front that has moist, unstable air?

- A- Stratiform clouds, lightning, steady precipitation.
- B- Cumuliform clouds, smooth air, steady precipitation.
- C- Cumuliform clouds, turbulent air, showery-type precipitation.

3220. A moist, cold air mass that is being warmed from below is characterized, in part, by

- A- fog and drizzle.
- B- showers and thunderstorms.
- C- continuous heavy precipitation.

3221. What is a characteristic of stable air?

- A- Excellent visibility.
- B- Restricted visibility.
- C- Shower-y-type precipitation.

3222. What type weather can one expect from moist, unstable air and very warm surface temperature?

- A- Fog and low stratus clouds.
- B- Continuous heavy precipitation.
- C- Strong updrafts and cumulonimbus clouds,

3223. What is a typical characteristic of a stable air mass?

- A- Cumuliform clouds.
- B- Showery precipitation.
- C- Continuous precipitation.

3224. A moist, warm air mass that is being cooled from below is characterized, in part, by

- A- smooth air.
- B- cumuliform clouds.
- C—** showers and thunderstorms.

3225. Frontal waves normally form on

- A- stationary or occluded fronts.
- B- slow-moving warm fronts or occluded fronts.
- C- slow-moving cold fronts or stationary fronts.

3226. A moist, cold air mass that is being warmed from below is characterized, in part, by

- A- instability and showers.
- B- stability, fog, and drizzle.
- C—** instability and continuous precipitation.

3227. If a wave were to form on a stationary front running east and west across the United States, that portion east of the wave would normally

- A- remain stationary with that portion west of the wave becoming a cold front.
- B- become a warm front and that portion west of the wave would become a cold front.
- C- become a cold front and that portion west of the wave would become a warm front.

3223. Which statement is true regarding a cold front occlusion?

- A- The air ahead of the warm front is warmer than the air behind the overtaking cold front.
- B- The air ahead of the warm front has the same temperature as the air behind the overtaking cold front.
- C- The air between the warm front and cold front is colder than either the air ahead of the warm front or the air behind the overtaking cold front.

3229. Consider the following statements about mountain waves:

1. Mountain waves always develop in a series on the upwind (windward) side of mountain ridges.
2. In a mountain wave, the air dips sharply downward immediately to the lee side of a ridge, before rising and falling in a wave motion for a considerable distance downstream.
3. If the air is humid and the wave is of large amplitude, lenticular (lens-shaped) clouds mark the wave's crest.
4. In a typical wave, the greatest amplitude is seldom more than 1,000 feet above the ridge crest elevation.

From the statements above, select those which are true.

- A - 2 and 3.
- B - 1, 2, and 3.
- C - 1, 3, and 4.

3230. When flying low over hilly terrain, ridges, or mountain ranges, the greatest potential danger from turbulent air currents will usually be encountered on the

- A- leeward side when flying with the wind.
- B- leeward side when flying into the wind.
- C—** windward side when flying into the wind.

3231. Low-level wind shear, which results in a sudden change of wind direction, may occur

- A- after a warm front has passed.
- B- when surface winds are light and variable.
- C- when there is a low-level temperature inversion with strong winds above the inversion.

3232. Which condition could be expected if a strong temperature inversion exists near the surface?

- A- Strong, steady downdrafts and an increase in OAT.
- B- A wind shear with the possibility of a sudden loss of airspeed.
- C- **An** OAT increase or decrease with a constant wind condition.

3233. Which situation would most likely result in freezing rain?

- A- Rain falling from air which has a temperature of more than 32 °F into air having a temperature of 32 °F or less.
- B- Rain falling from air which has a temperature of 32 °F or less into air having a temperature of more than 32 °F.
- C- Rain which has a supercooled temperature of 0 °C or less falling into air having a temperature of more than 0 °C.

3234. The most rapid accumulation of clear ice on an aircraft in flight may occur with temperatures between 0 °C to -15 °C in

- A- cumuliform clouds.
- B- stratiform clouds.
- C- any clouds or dry snow.

3235. Which is an operational consideration regarding aircraft structural icing?

- A- It is unnecessary for an aircraft to fly through rain or cloud droplets for structural ice to form.
- B- Clear ice is most likely to form on an airplane when flying through stratified clouds or light drizzle.
- C- In order for structural ice to form, the temperature at the point where moisture strikes the aircraft must be 0 °C (32 °F) or colder.

3236. What are the minimum requirements for the formation of a thunderstorm?

- A- Sufficient moisture and a lifting action.
- B- Sufficient moisture, an unstable lapse rate, and lifting action.
- C- Towering cumulus clouds, sufficient moisture, and a frontal zone.

3237. Select the true statement pertaining to the life cycle of a thunderstorm.

- A- The initial stage of a thunderstorm is always indicated by the development of a nimbus cloud.
- B- The beginning of rain at the Earth's surface indicates the mature stage of the thunderstorm.
- C- The beginning of rain at the Earth's surface indicates the dissipating stage of the thunderstorm.

3238. Tornadoes are most likely to occur with which type of thunderstorms?

- A- Tropical thunderstorms during the mature stage.
- B- Squall line thunderstorms that form ahead of warm fronts.
- C- Steady-state thunderstorms associated with cold fronts or squall lines.

3239. What feature is associated with the cumulus stage of a thunderstorm?

- A- Frequent lightning.
- B- Continuous updrafts.
- C- Beginning of rain at the surface.

3240. Which type of cloud is associated with violent turbulence and a tendency toward the production of funnel clouds?

- A- Cumulonimbus mamma.
- B- Standing lenticular.
- C- Altocumulus castellanus.

3241. A squall line is usually associated with

- A- a stationary front.
- B- a fast-moving cold front.
- C- a fast-moving warm front.

3242. Consider the following statements regarding hail as an in-flight hazard and select those which are correct.

1. There is a correlation between the visual appearance of thunderstorms and the amount of hail within them.
2. Large hail is most commonly found in thunderstorms which have strong updrafts and large liquid water content.
3. Hail may be found at any level within a thunderstorm but not in the clear air outside of the storm cloud.
4. Hail is usually produced during the mature stage of the thunderstorm's lifespan.
5. Hailstones may be thrown upward and outward from a storm cloud for several miles.

The true statements are:

- A - **2, 4,** and 5.
- B - 1, 2, and 3.
- C - 1, 2, 4, and 5.

3243. Which statement is true concerning the in-flight hazard of hail?

- A- Hail is usually produced by altocumulus clouds.
- B- Rain at the surface indicates the absence of hail aloft.
- C- Hailstones may be thrown outward from a storm cloud for several miles.

3244. Hail, an in-flight hazard, is most likely to be associated with

- A- cumulus clouds.
- B- stratocumulus clouds.
- C- cumulonimbus clouds.

3245. Hail will most likely be encountered

- A- beneath the anvil cloud of a large cumulonimbus.
- B- during the dissipating stage of the cumulonimbus.
- C- above the cumulonimbus cloud well above the freezing level.

3246. One condition necessary for the formation of fog is

- A- calm air.
- B- visible moisture.
- C- high relative humidity.

3247. Radiation fog is most likely to occur under what conditions?

- A- Warm, moist air being forced **upslope** by light winds resulting in the air being cooled and condensed.
- B- High humidity during the early evening, cool cloudless night with light winds, and favorable topography.
- C- Low temperature/dewpoint spread, calm wind conditions, the presence of hygroscopic nuclei, low overcast, and favorable topography.

3249. Advection fog is formed as a result of

- A- moist air moving over a colder surface.
- B- the addition of moisture to a mass of cold air as it moves over a body of water.
- C- the ground cooling adjacent air to the **dewpoint** temperature on clear, calm nights.

3249. With respect to advection fog, which statement is true?

- A- It forms almost exclusively at night or near daybreak.
- B- It forms when unstable air is cooled adiabatically.
- C- It can appear suddenly during day or night, and it is 'more persistent than radiation fog.

3250. Which in-flight hazard is most commonly associated with warm fronts?

- A- Ground fog.
- B- Advection fog.
- C- Precipitation-induced fog.

3251. Fog associated with a warm front is a result of saturation due to

- A- nocturnal cooling.
- B- evaporation of precipitation.
- C- evaporation of surface moisture.

3252. In reference to clear air turbulence (CAT), areas to be avoided are those where horizontal wind shear exceeds

- A - 40 knots ~~per~~ 150 miles.
- B - 10 knots ~~per~~ 50 miles.
- C - 6 knots per 1,000 feet.

3253. Which statement is true regarding the effect of fronts on soaring conditions?

- A- A slow-moving front provides the strongest lift.
- B- Excellent soaring conditions usually exist in the cold air ahead of a warm front.
- C- Frequently the air behind a cold front provides excellent soaring for several days.

3254. The conditions most favorable to wave formation over mountainous areas are a layer of

- A- unstable air at mountaintop altitude and a wind of at least 20 MPH blowing across the ridge.
- B- stable air at mountaintop altitude and a wind of at least 20 MPH blowing across the ridge.
- C- moist, unstable air at mountaintop altitude and a wind of less than 5 MPH blowing across the ridge.

3255. When soaring in the vicinity of mountain ranges, the greatest potential danger from vertical and rotor-type currents will usually be encountered on the

- A- leeward side when flying with the wind.
- B- leeward side when flying into the wind.
- C- windward side when flying into the wind.

3256. Select the true statement concerning thermals.

- A- Strong thermals have proportionately increased sink in the air between them.
- B- Thermals will not develop unless the Sun's rays strike the Earth at a vertical angle.
- C- A thermal invariably remains directly above the surface area from which it developed.

3257. One of the most dangerous features of mountain waves is the turbulent areas in and

- A- below rotor clouds.
- B- above rotor clouds.
- C- below lenticular clouds.

3258. **Which** thermal indices would predict the best probability of good soaring conditions?

- A - +5.
- B- -5.
- c- -10.

3259. One method for locating thermals is to

- A- fly an ever increasing circular path.
- B- look for diverging streamers of dust or smoke.
- C- look for converging streamers of dust or smoke.

3260. An important precaution when soaring in a dust devil is to

- A- avoid the eye of the vortex because of extreme turbulence.
- B- avoid steep turns on the upwind side to prevent being blown into the vortex.
- C- avoid the clear area at the outside edge of the dust because of severe downdrafts.

3261. One of the best visual indications of a thermal is a

- A- smooth cumulus cloud with a concave base.
- B- broken to overcast sky with cumulus clouds.
- C- fragmented cumulus cloud with a concave base.

3262. **The** most favorable type thermals for cross-country soaring may be found

- A- under mountain waves.
- B- along thermal streets.
- C- just ahead of a warm front.

3263. Convective circulation patterns associated with sea breezes are caused by

- A- land absorbing and radiating heat faster than the water.
- B- warm and less dense air moving inland from over the water, causing it to rise.
- C- cool and less dense air moving inland from over the water, causing it to rise.

3264. Which statement is true regarding the development of convective circulation?

- A- Cool air must sink to force the warm air upward.
- B- Warm air is less dense and rises on its own accord.
- C- Cool air surrounding convective circulation sinks at a greater rate than the warmer air rises (within the thermal), thus forcing the warmer air upward.

3265. Under what condition can enough lift be found for soaring under stable weather conditions?

- A- Over steep escarpments or cliffs.
- B—** In mountain waves that form on the upwind side of the mountains.
- C- On the upwind side of hills or ridges with moderate winds present.

3266. (Refer to figure 2.) Using the sounding taken at 0900 from 2,500 feet to 15,000 feet, as shown on the Pseudo-Adiabatic Chart, what minimum surface temperature is required for instability to occur and for good thermals to develop from the surface to 15,000 feet MSL?

- A- 58 °F.
- B- 80 °F.
- C- 90 °F.

3267. (Refer to figure 2.) At the 0900 sounding and the line plotted from the surface to 10,000 feet, what temperature must exist at the surface for instability to take place between these altitudes?

- A- Any temperature more than 68 °F.
- B- Any temperature less than 68 °F.
- C- Any temperature between 43 °F and 68 °F.

3268. (Refer to figure 2.) According to the soundings taken at 1400, is the atmosphere stable or unstable and at what altitudes?

- A- Stable from 6,000 to 10,000 feet.
- B- Stable from 10,000 to 13,000 feet.
- C- Unstable from 10,000 to 13,000 feet.

3269. (Refer to figure 2.) Using the 1400 soundings, does an inversion exist and, if so, at what altitudes?

- A- No; there is no inversion shown.
- B- Yes; between 10,000 and 13,000 feet.
- C- Yes; between 13,000 and 15,000 feet.

3270. (Refer to figure 2.) Using the 1400 soundings, between what altitudes **could** good thermalling be expected?

- A- 2,500 to 6,500 feet.
- B- 6,000 to 10,000 feet.
- C- 10,000 to 13,000 feet.

3271. (Refer to figure 3.) Which station is reporting the wind as calm?

- A- DAL.
- B - **FTW**.
- C- TYR.

3272. (Refer to figure 3.) What is the reported duration of the rain at the time of the observation at **AUS**?

- A- 25 minutes.
- B- 26 minutes.
- C- 36 minutes.

3273. (Refer to figure 3.) What does the **LB26E40** mean at the end of the report for AMA?

- A— Drizzle began at 26 past the hour and ended at 40 past the hour.
- B— Lightning began at 1726 with 40 percent coverage of radar echoes.
- C— There are large buildups to the east with wind gusting 26 to 40 knots.

3274. (Refer to figure 3.) Which station is reporting the lowest visibility?

- A - **AUS**.
- B- FTW.
- C- TYR.

3275. (Refer to figure 3.) The altimeter setting at **AUS** is

- A- 1016.9 mb.
- B- 30.05" Hg.
- C- 31.69" Hg.

3276. (Refer to figure 3.) In the report for BKO, what is the reported ceiling?

- A- 2,000 feet.
- B— 13,000 feet.
- C- 25,000 feet.

3277. GIVEN:

RADAT91M024085105/1.

The relative humidity was 91 percent at

- A- all levels.
- B- 2,400 feet MSL.
- C- 8,500 feet MSL.

3278. GIVEN:

RADAT88M018055097/2.

How many crossings of the zero degree Celsius isotherm have occurred?

- A- 5.
- B- 4.
- c- 3.

3279. GIVEN:

OUN AMOS 36/26/3618/007 PK WIND 27 024.

The 024 indicates

- A- the peak wind occurred 24 minutes past the hour.
- B- 24 hundredths of an inch of liquid precipitation since the last observation.
- C- a drop of 24 hundredths of an inch of mercury in the altimeter setting in the last hour.

3280. Interpret the following radar weather report:

LIT 1133 AREA 4TRW 221100 88/170 196/180 220/115 C2425 MT 310 AT 162/110

- A- There are four cells with tops at 10,000 feet, 17,000 feet, and 11,500 feet.
- B- The maximum top of the cells is located 162" and 110 NM from the station (LIT).
- C- The visibility is 4 miles in thunderstorms and the intensity of thunderstorms remains unchanged.

3281. Which statement is true concerning this radar weather report for OKC?

OKC 1934 LN 8TRW / **86/** 40 **164/60 199/115** 15W
2425 MT 570 AT **159/65** 2 INCH HAIL RPRTD
THIS ECHO.

- A- The visibility is 8 miles in rain showers.
- B- There are three cells with tops at 11,500, 40,000, and 60,000 feet.
- C—** The maximum top of the cells is 57,000 feet located 65 NM south-southeast of the station.

3282. (Refer to figure 4.) Which is a true statement?

- A- It is clear above 8,500 feet at DAL.
- B- There are moderate buildups west of ABI.
- C- The pilot reported a north wind at 30 knots at BRO.

3283. (Refer to figure 4.) Turbulence was reported west of

- A - **AUS**.
- B- ABI.
- C- BRO.

3284. (Refer to figure 4.) Which is the true statement?

- A- Thunderstorms were reported north of BRO.
- B- Moderate turbulence was reported by a pilot east of ABI.
- C- The base of the overcast at **AUS** was reported to be 13,000 feet.

3285. (Refer to figure 4.) The lowest cloud base reported is

- A- 500 feet at BRO.
- B- 4,500 feet at DAL.
- C- 5,000 feet at BRO.

3286. (Refer to figure 5.) What is the visibility forecast for BRO?

- A- 1 mile.
- B- 3 miles.
- C- Greater than 6 miles.

3287. (Refer to figure 5.) What type of weather can be expected after 0400Z at DAL?

- A- At least a ceiling of 1,000 feet and visibility of 3 miles.
- B- Ceiling of more than 3,000 feet and visibility greater than 5 miles.
- C—** Ceiling greater than 5,000 feet and visibility greater than 5 miles.

3288. (Refer to figure 5.) Which of the stations are forecasting the wind to be less than 6 knots for the entire forecast period?

- A- ABI.
- B- ACT.
- C- **AUS** and ACT.

3289. (Refer to figure 5.) The valid time for the forecasts is from

- A- 0940Z on the 30th until 0940Z the following day.
- B- 1010Z on the 30th until **1000Z** the following day.
- C- **1000Z** on the 30th until **1000Z** on the following day.

3290. (Refer to figure 5.) What is the lowest ceiling forecast for ABI?

- A- 1,000 feet.
- B- 1,400 feet.
- C- 10,000 feet.

3291. To determine the freezing level and areas of probable icing aloft, you should refer to the

- A- Area Forecast.
- B- Weather Depiction Chart.
- C- Surface Analysis Weather Chart.

3292. For a brief summary of the location and movement of fronts, pressure systems, and circulation patterns, the pilot should refer to the

- A- Area Forecast.
- B- Stability Chart.
- C- Radar Summary Chart.

3293. What is the meaning of the term **MVFR**, as used in the categorical outlook portion of Terminal and Area Forecasts?

- A- A ceiling less than 1,000 feet and/or visibility less than 3 miles.
- B- A ceiling less than 1,000 feet and/or visibility less than 1 mile.
- C- A ceiling of 1,000 to 3,000 feet and/or visibility of 3 to 5 miles.

3294. An Area Forecast is valid for

- A- 12 hours with an additional 6 hours categorical outlook.
- B- 12 hours with an additional 12 hours categorical outlook.
- C- 18 hours with an additional 12 hours categorical outlook.

3295. (Refer to figure 6.) What is the forecast for northwestern Alabama after **2300Z**?

- A- IFR with widely scattered thunderstorms.
- B- Ceilings of 1,000 to 3,000 feet and/or visibility of 3 to 5 miles with possible rain showers.
- C- Ceilings below 1,000 feet and visibility restricted to 3 miles by light rain and fog.

3296. (Refer to figure 6.) This forecast is valid for

- A- 24 hours with an additional **12-hour** outlook.
- B- 18 hours with an additional **12-hour** outlook.
- C- 12 hours with an additional 6-hour outlook.

3297. (Refer to figure 6.) What is the forecast visibility for south-central Texas for the period ending **2300Z**?

- A- 3 miles.
- B- More than 6 miles.
- C- This visibility is not forecast.

3298. (Refer to figure 6.) The lowest layer of clouds forecast for Oklahoma is

- A- 100 feet AGL.
- B- below 1,000 feet MSL.
- C- below 1,000 feet AGL.

3299. What information would be covered in an **AIRMET**?

- A- Severe turbulence.
- B- Extensive mountain obscurement.
- C- Hail of **3/4** inch or greater diameter.

3300. Which in-flight advisory would contain information on severe icing?

- A - **PIREP**.
- B- **SIGMET**.
- C- Convective **SIGMET**.

3301. What information is contained in a convective **SIGMET** in the conterminous United States?

- A- Moderate thunderstorms and surface winds greater than 40 knots.
- B- Tornadoes, embedded thunderstorms, and hail **3/4** inch or greater in diameter.
- C- Severe icing, severe turbulence, or widespread dust storms lowering visibility to less than 3 miles.

3302. (Refer to figure 7.) What is the temperature for 6,000 feet at AMA?

- A- 8 °C.
- B- The temperature is standard for that altitude.
- C- No temperatures are forecast for levels within 2,500 feet of station elevation.

3303. (Refer to figure 7.) Why is there no wind forecast for 3,000 and 6,000 feet at ABQ?

- A- Wind which is expected to be light and variable is omitted.
- B- No winds are forecast within 1,500 feet of station elevation.
- C- No winds are forecast within 3,000 feet of station elevation.

3304. (Refer to figure 7.) What is the forecast wind for 12,000 feet at AMA?

- A- Calm.
- B- Light and variable.
- C- 090° in excess of 50 knots.

3305. (Refer to figure 7.) What is the temperature at 30,000 feet for DAL?

- A - **+40 °C**.
- B- **-40 °C**.
- C- **-40 °F**.

3306. (Refer to figure 7.) What is the forecast wind at 30,000 feet for BRO?

- A- 230° at 47 knots.
- B— 130° at 147 knots.**
- C— 280° at 147 knots.

3307. (Refer to figure 7.) What is the forecast wind at 3,000 feet for DAL?

- A- 100° at 8 knots.
- B- 010° at 8 knots.
- C- 080° at 10 knots.

3308. By referring to the isobars on a Surface Analysis Weather Chart, what can a person determine?

- A- Pressure gradient.
- B- Temperature changes.
- C- Areas of precipitation.

3309. The intensity trend of a front (as of chart time) is best determined by referring to a

- A- Surface Analysis.
- B- Radar Summary Chart.
- C- Weather Depiction Chart.

3310. (Refer to figure 8.) **What** does this symbol mean on a Surface Analysis Weather Chart?

- A- Squall line.
- B- Occluded front.
- C- High-pressure ridge.

3311. (Refer to figure 9.) Which symbol used on a Surface Analysis Weather Chart represents a dissipating warm front?

- A- 1.
- B- 2.
- c- 3.

3312. (Refer to figure 10.) On a Weather Depiction Chart, what does this information mean?

- A- Visibility 5 miles, sky obscured.
- B- Visibility 5 miles, haze, overcast, ceiling 3,500 feet.
- C- Visibility 3 to 5 miles, sky obscured, ceiling 5,000 feet.

3313. On a Weather Depiction Chart, what weather conditions would be contained in an unshaded area that is enclosed by a smooth line?

- A- Ceiling less than 1,000 feet and/or visibility less than 3 miles.
- B- Ceiling between 5,000 and 7,000 feet and/or visibility greater than 5 miles.
- C- Ceiling between 1,000 and 3,000 feet and/or visibility between 3 and 5 miles.

3314. A Weather Depiction Chart is useful to a pilot in determining

- A- the temperature and **dewpoint** at selected stations.
- B- the forecast areas of cloud cover and precipitation.
- C— areas where weather conditions were reported above or below VFR minimums.**

3315. (Refer to figure 11.) On a Weather Depiction Chart, what does this information mean?

- A- Visibility one-half mile, 200 feet overcast, smoke.
- B- Visibility 2 miles, sky obscured, haze, ceiling 2,000 feet.
- C- Visibility 2 miles, sky obscured, fog, cloud layer at 20,000 feet.

3316. (Refer to figure 12.) The Weather Depiction Chart indicates that the coastal sections of Texas and Louisiana are reporting

- A- marginal VFR conditions due to broken ceilings of 2,000 feet.
- B- VFR conditions with scattered clouds at 2,000 feet and higher cirriform.
- C- all ceilings at or above 20,000 feet with visibilities of 20 miles or more.

3317. (Refer to figure 12.) The Weather Depiction Chart indicates the heaviest precipitation along the front is occurring in

- A- Kansas.
- B- Missouri.
- C- Illinois.

3318. (Refer to figure 12.) The Weather Depiction Chart indicates that northern Illinois and southern Wisconsin are reporting

- A- low IFR conditions due to ceilings below 500 feet with drizzle.
- B- marginal VFR conditions due to reduced visibility in drizzle and fog.
- C- IFR conditions due to overcast ceilings less than 1,000 feet with reduced visibilities in rain and rain showers.

3319. (Refer to figure 12.) The Weather Depiction Chart indicates that most of Virginia is reporting

- A- marginal VFR conditions due to extensive low ceilings.
- B- IFR conditions due to very low visibilities and frontal buildups.
- C- marginal VFR conditions due to reduced visibilities in fog and haze.

3320. (Refer to figure 12.) What restrictions to visibility are depicted in western Iowa?

- A- Drizzle.
- B- Fog, rain, and haze.
- C- Drizzle, fog, and rain.

3321. (Refer to figure 13.) What is the direction and speed of movement of the line that extends from southwestern Nebraska to east-central Minnesota?

- A- Northeast at 50 knots.
- B- Southeast at 22 knots.
- C- Northeast at 30 knots.

3322. (Refer to figure 13.) What is the VIP level of area A?

- A- 2.
- B- 3.
- C- 5.

3323. (Refer to figure 13.) What does the 280 in area C mean?

- A- The base of the clouds is 2,800 feet MSL.
- B- Coverage of precipitation is 28.0 percent.
- C- The highest top of precipitation is 28,000 feet MSL.

3324. (Refer to figure 13.) What is the VIP level of the black area in area F?

- A- 3.
- B- 4.
- C- 6.

3325. A Radar Summary Chart can be very helpful to a pilot because it graphically displays

- A- the intensity and movement of precipitation.
- B- ceilings and precipitation between reporting stations.
- C- areas of clouds, ceiling heights, and intensity of freezing precipitation.

3326. (Refer to figure 14.) Which area(s) should have the lowest ceilings at **1800Z**?

- A- The area just ahead of the cold front.
- B- The area extending from northern Kansas to western Wisconsin.
- C- The areas where precipitation is expected to occur, east of the cold front and west of the warm front.

3327. (Refer to figure 14.) Where is snow expected at **1800Z**?

- A- Northern Oregon and Washington.
- B- In the central Great Lakes area.
- C- From northwest Kansas to the Great Lakes and from northwest Colorado northward to Canada.

3328. (Refer to figure 14.) What type precipitation is expected in eastern Arkansas at **1800Z**?

- A- Rain showers over the entire area.
- B- Continuous rain over the entire area.
- C- Rain showers and thunderstorms affecting .5 or more of the area.

3329. (Refer to figure 14.) At what altitude is the freezing level in central Oklahoma as forecast on the **24-hour** Significant Weather Prog?

- A- 4,000 feet MSL.
- B- 5,000 feet MSL.
- C- 6,000 feet MSL.

3330. (Refer to figure 14.) At what altitude is the freezing level in central Oklahoma as forecast on the **12-hour** Significant Weather Prog?

- A- On the surface.
- B- 4,000 feet MSL.
- C- 8,000 feet MSL.

3331. Which weather chart depicts the conditions forecast to exist at a specific time in the future?

- A- Prognostic.
- B- Surface Analysis.
- C- Weather Depiction.

3332. Which is an operational consideration concerning U.S. Low-Level Significant Weather Prognostic Charts?

- A- The charts are designed for use in domestic flight planning to 24,000 feet.
- B- This is a four-panel chart that forecasts the weather for a period of 48 hours.
- C- The valid time of the charts corresponds to the time of the plotted observations and they are not forecasts.

3333. (Refer to figure 15.) This High-Level Significant Weather Prognostic Chart encompasses airspace from

- A- FL240 to FL630.
- B- 20,000 feet MSL to FL610.
- C- 10,000 feet MSL to 51,000 feet MSL.

3334. (Refer to figure 15.) The 340 in a rectangle, at area A, means the forecast

- A- height of the tropopause in millibars.
- B- highest altitude for turbulence in that area.
- C- height of the tropopause in hundreds of feet MSL.

3335. (Refer to figure 15.) What is the type and intensity of the forecast turbulence in area B?

- A- Clear air turbulence, light to severe in intensity.
- B- Convective turbulence, light to moderate in intensity.
- C- Clear air turbulence, moderate to severe in intensity.

3336. (Refer to figure 15.) What is the forecast extent of the turbulence in area C?

- A- From below FL240 to FL320.
- B- From FL180 to 36,000 feet MSL.
- C- From the surface to 32,000 feet MSL.

3337. (Refer to figure 15.) What is the forecast coverage of thunderstorms in area D?

- A- **1/8** to **4/8**.
- B- 1/2 or less.
- C- Less than **1/8**.

3338. (Refer to figure 15.) In area F, what is the significance of the numbers 510 over the 3 X's?

- A- Cloud bases are forecast to be from 18,000 feet MSL to 51,000 feet MSL.
- B- Cloud bases are forecast to be below FL240 and the tops are forecast to reach FL510.
- C- Turbulence is forecast to be severe from 24,000 feet MSL to 51,000 feet MSL.

3339. (Refer to figure 16.) What percent coverage of severe thunderstorms is forecast to occur in the area of moderate risk in the north-central United States?

- A - 6 to 10 percent.
- B - 10 to 50 percent.
- C - 50 to 90 percent.

3340. If an area on a Severe Weather Outlook Chart is labeled APCHG, this indicates

- A- possible tornadoes.
- B- thunderstorm activity may approach extreme intensity.
- C- winds greater than or equal to 35 knots but less than 50 knots.

3341. (Refer to figure 16.) A crosshatched area on the Severe Weather Outlook Chart indicates a

- A- current tornado watch area.
- B- severe weather outlook area.
- C- forecast severe thunderstorm watch area.

3342. (Refer to figure 17.) What are the probable weather conditions in the area indicated by arrow B on the Stability Chart?

- A- Neutral stability; showery precipitation.
- B- Stable air; stratified cloudiness and steady precipitation.
- C- Moderate humidity and unstable air; scattered shower activity.

3343. (Refer to figure 17.) What are the probable weather conditions in the area indicated by arrow C on the Stability Chart?

- A- Unstable air; instability, showers, and thunderstorms.
- B- Neutral stability; stratus clouds and light precipitation.
- C- Moderately saturated air; steady precipitation and light turbulence.

3344. (Refer to figure 17.) What are the probable weather conditions in the area indicated by arrow D on the Stability Chart?

- A- Stable air; predominately fair.
- B- High relative humidity; showers and thunderstorms.
- C- Marginally unstable air; moderate turbulence and possible thunderstorms.

3345. (Refer to figure 17.) Which symbol on the Stability Chart signifies very stable air and no precipitation?

- A - $\frac{23}{-15}$
- B - $\frac{-3}{3 \ 4}$
- C - $\frac{0}{3 \ 5}$

3346. From which of the following can the observed temperature, wind, and temperature/dewpoint spread be determined at specified flight levels?

- A- Stability Charts.
- B- Winds Aloft Forecasts.
- C- Constant Pressure Charts.

3347. When using a Constant Pressure Analysis Chart for planning a flight at 10,000 feet MSL, which analysis should the pilot refer to?

- A - **850-millibar.**
- B- 700-millibar.
- C - **500-millibar.**

3348. What is the expected duration of an individual microburst?

- A- One microburst may continue for as long as an hour.
- B- Five minutes with maximum winds lasting approximately 2 to 4 minutes.
- C- Seldom longer than 15 minutes from the time the burst strikes the ground until dissipation.

3349. Maximum downdrafts in a microburst encounter may be as strong as

- A- 6,000 feet per minute.
- B- 4,500 feet per minute.
- C- 1,500 feet per minute.

3350. How long do the maximum intensity winds last in an individual microburst?

- A- 2 to 4 minutes.
- B- 5 to 10 minutes.
- C- 15 minutes.

3351. What document(s) must you have in your personal possession while operating as pilot in command of an aircraft?

- A- An appropriate pilot certificate and a current medical certificate.
- B- A certificate showing accomplishment of a checkout in the aircraft and a current flight review.
- C- A pilot logbook with endorsements showing accomplishment of a current flight review and **recency** of experience.

3352. A person whose Flight Instructor Certificate has been suspended may not

- A- give flight instruction, but may apply for a rating to be added to that certificate.
- B- apply for any rating to be added to that certificate during the period of suspension.
- C- apply for any Flight Instructor Certificate for a period of 1 year after the date of the suspension.

3353. If a Second-Class Medical Certificate was issued to a commercial pilot 13 months ago, during the next 11 months this pilot may

- A- not act as pilot in command or carry passengers or property.
- B- act as pilot in command and carry passengers or property, but not for compensation or hire.
- C- act as pilot in command for compensation or hire, but may not carry passengers or property for compensation or hire.

3354. What is the duration of a Student Pilot Certificate?

- A- Indefinite.
- B- 12 months after the month in which it was issued.
- C- 24 months after the month in which it was issued.

3355. What is the duration of a Flight Instructor Certificate?

- A- Indefinite, unless suspended or revoked.
- B- 24 months after the month in which it was issued or renewed.
- C- Indefinite, as long as the holder has a current pilot and medical certificate appropriate to the pilot privileges being exercised.

3356. A Third-Class Medical Certificate was issued on May 3. To exercise the privileges of a Private Pilot Certificate, the medical certificate will be valid through

- A - May 3, 24 months later.
- B - May 31, 12 months later.
- C - May 31, 24 months later.

3357. A Second-Class Medical Certificate issued January 18 of this year will expire

- A- January 18 of next year for private pilot privileges.
- B- January 31 of next year for commercial pilot privileges.
- C- January 31, 2 years later for commercial pilot privileges.

3358. Conviction of an offense involving alcohol or drugs is grounds for

- A- permanent revocation of all certificates and ratings.
- B- suspension or revocation of any certificate or rating issued under FAR Part 61.
- C- denial of an application for any certificate or rating issued under FAR Part 61 for a period of up to 24 months after date of conviction.

3359. To act as pilot in command of an airplane that has more than 200 horsepower, a person holding a Private or Commercial Pilot Certificate is required to

- A- pass a flight test in such an airplane.
- B- make three solo takeoffs and landings in such an airplane.
- C- receive flight instruction in an airplane that has more than 200 horsepower.

3360. Unless otherwise authorized, a pilot in command is required to possess a type rating for that airplane when operating any

- A- airplane with a gross weight in excess of 6,000 pounds.
- B- airplane with a gross weight in excess of 12,500 pounds.
- C- multiengine airplane with a gross weight in excess of 6,000 pounds.

3361. To act as pilot in command of a high performance airplane, a person holding a Private or Commercial Pilot Certificate is required to

- A- complete a practical test in such an airplane.
- B- have made at least three takeoffs and landings in such an airplane in the last 90 days.
- C- receive flight instruction in such an airplane and obtain a logbook endorsement of competency.

3362. To be eligible (in part) to take an FAA written test, an applicant must show proof of

- A- medical qualification appropriate to the certificate being sought.
- B- meeting the minimum age requirement for the issuance of the certificate being sought.
- C- satisfactory completion of the appropriate ground instruction or home study course.

3363. A person who has cheated or committed any unauthorized act during a written test may not take another written test within

- A- 90 days.
- B- 1 year.
- C- 2 years.

3364. What action may be taken against a person who has cheated on a written test?

- A- That person may be required to wait up to 24 months before taking any written test.
- B- That person may be required to wait a maximum of 6 months before taking any written test.
- C- Any airman or ground instructor certificate or rating held may be suspended or revoked.

3365. What class medical certificate, if any, is required for a person adding a rating to a pilot certificate?

- A- None.
- B- Second-Class.
- C- Third-Class.

3366. A written statement from an appropriately rated flight instructor certifying that an applicant has received the required instruction in preparation for a flight test must be dated within a minimum of how many days preceding the date of application?

- A- 60 days.
- B- 90 days.
- C- 120 days.

3367. To be eligible for a practical test under FAR Part 61, an applicant is required to have passed the appropriate written test within the preceding

- A- 6 calendar months.
- B— 12 calendar months.**
- C- 24 calendar months.

3368. An applicant has failed a pilot written test for the second time. That applicant may apply for a retest after how many days?

- A- 5.
- B- 10.
- c- 30.

3369. An applicant who fails a pilot written test for the first time may apply for retesting after

- A- waiting for a period of 20 days.
- B- receiving 5 hours of ground instruction from an authorized ground instructor.
- C- presenting a written statement from an authorized instructor certifying that the appropriate ground instruction has been given and the applicant is competent to pass the test.

3370. An applicant who fails a practical test for the second time may apply for retesting after

- A- 30 days have passed.
- B- receiving 5 hours of appropriate instruction.
- C- presenting a letter of competency to the examiner signed by a current flight instructor.

3371. Which instruction time must be certified by the instructor from whom it was received?

- A- Flight instruction.
- B- Flight instruction and ground trainer instruction.
- C- Flight. instruction, pilot ground trainer instruction, and ground instruction.

3372. What flight time must be shown, in a reliable record, by a pilot exercising the privileges of a commercial certificate?

- A- All flight time.
- B- All flight time flown with passengers aboard the aircraft.
- C- Only the flight time necessary to meet the recent experience requirements.

3373. Which operation requires a recreational pilot to carry his or her logbook?

- A- When flying during the hours of sunrise to sunset.
- B- In airspace requiring communications with air **traffic** control.
- C- Any solo flight up to 50 miles from the airport or point of departure.

3374. An annual flight review is required for all

- A- recreational pilots, regardless of flight time.
- B- non-instrument rated private pilots with less than 400 hours' flight time.
- C- non-instrument rated commercial pilots acting as pilot in command.

3375. An annual flight review will consist of at least

- A- 1 hour of flight time to include three takeoffs and landings.
- B- 2 hours of flight instruction to include three takeoffs and landings.
- C- a minimum of 1 hour ground instruction and 1 hour flight instruction.

3376. A flight instructor who has not satisfactorily accomplished a biennial flight review or passed a required proficiency check within the prescribed time is

- A- not authorized to fly solo.
- B- authorized to fly solo only.
- C- not authorized to give instruction except to holders of Recreational Pilot Certificates,

3377. An annual flight review for a **glider, pilot** with less than 400 hours' flight time must consist of at least 1 hour of ground instruction and

- A- three takeoffs and landings.
- B- three flights, each of which includes a 360° turn.
- C- 1 hour of flight instruction to include three **360°** turns.

3378. What recent flight experience must be met before a commercial airplane pilot may fly solo in an airplane?

- A- Three takeoffs and three landings within the preceding 90 days in an airplane.
- B- Satisfactorily accomplished a flight review in any aircraft for which rated, within the preceding 24 calendar months.
- C- Satisfactorily accomplished a flight review within the preceding 24 calendar months, but this review must be in an airplane.

3379. To meet the recent flight experience requirements for acting as pilot in command carrying passengers at night, a pilot must have made, within the preceding 90 days and from 1 hour **after** sunset to 1 hour before sunrise, three takeoffs and three landings to a full stop in

- A- the same category of aircraft to be used.
- B- the same category and class of aircraft to be used.
- C- the same category, class, and, if a type rating is required, the same type of aircraft to be used.

3380. A private pilot has completed three takeoffs and three landings to a full stop within the preceding 90 days in a tricycle-gear airplane, single-engine land, and decides to take a passenger for a flight in a conventional-gear airplane, single-engine land. Since these aircraft are of the same category and class, the pilot is current in

- A- both airplanes.
- B- the tricycle-gear airplane.
- C- the conventional-gear airplane.

3381. If **recency** of experience requirements for night flight are not met and **official** sunset is 1830, the latest time passengers may be carried is

- A- 1829.
- B- 1859.
- C- 1929.

3382. The holder of a pilot certificate who fails to notify the FAA Airmen Certification Branch in writing of a change in permanent mailing address may exercise the privileges of that pilot certificate for how many days after date of change?

- A- 30.
- B- 60.
- C- 90.

3383. When a permanent change of address occurs, pilot privileges may not be exercised unless the FAA Airmen Certification Branch is notified, in writing, within

- A- 30 days.
- B- 60 days.
- C- 90 days.

3384. A person seeking a private pilot glider rating is exempt from taking the written examination if that person

- A- holds a rating for powered aircraft.
- B- holds a pilot certificate for any category.
- C- has taken a written examination for any powered rating within the preceding 24 months.

3385. A private pilot with an airplane single-engine land rating may act as pilot in command of an airplane towing a glider, if within the preceding 12 months, this pilot has made

- A- ten actual or simulated glider tows.
- B- three flights as pilot in command of a glider towed by an aircraft.
- C- at least six flights as pilot in command of an airplane towing a glider.

3386. An applicant who is seeking a Student Pilot Certificate limited to helicopters is required to be at least how old?

- A- 16 years.
- ~~B—~~ 17 years.
- C- 18 years.

3387. To be eligible for a Student Pilot Certificate limited to airplanes, an applicant is required to be at least how old?

- A- 14 years.
- B- 16 years.
- C- 17 years.

3388. What is the minimum age requirement for the applicant who is seeking a Student Pilot Certificate limited to gyroplane operations?

- A- 14 years.
- ~~B—~~ 16 years.
- C- 18 years.

3389. The minimum age requirement for the applicant who is seeking a Student Pilot Certificate limited to glider operations is

- A- 17 years.
- B- 16 years.
- C- 14 years.

3390. Which is a required endorsement by an authorized flight instructor for a student pilot to operate an aircraft in solo flight?

- A- An endorsement that instruction was given in the make and model of aircraft to be soloed within the preceding 6 months.
- B- An endorsement within the preceding 90 days stating that instruction was given in the make and model aircraft to be flown and the student is competent to make a safe solo flight.
- C- An endorsement made within the preceding 180 days that instruction was given in the make of aircraft to be soloed and that the instructor found the applicant competent to make a safe flight in that aircraft.

3391. Prior to a first solo flight, the flight instructor is required to endorse the student's

- A - **logbook.**
- B- pilot certificate.
- C- logbook and pilot certificate.

3392. A student is required to have his/her pilot certificate endorsed by a flight instructor for each

- A- solo flight.
- B- solo cross-country flight.
- C- make and model of aircraft to be flown solo.

3393. Who is responsible for writing and grading the written test that each student must take prior to solo flight?

- A- Any certified ground instructor.
- B- FAA Airman Certification Branch in Oklahoma City.
- C- Flight instructor who will endorse the student's pilot certificate.

3394. What subjects must be covered on the presolo written test?

- A- Principles of flight, weather, and aircraft systems.
- B- Applicable regulations, flight characteristics, and operational limitations of make and model aircraft to be flown.
- C- Density altitude, operations from a controlled airport, and radio communications with appropriate air **traffic** control facilities.

3395. Prior to solo flight, a student must have received flight instruction in

- A- ground reference maneuvers.
- B- unusual attitude recoveries.
- C- basic radio navigation procedures.

3396. A student pilot whose pilot certificate is not endorsed by a flight instructor to make solo cross-country flights is prohibited from flying solo beyond what distance from the point of takeoff?

- A- 20 NM.
- B- 25 NM.
- C- 50 NM.

3397. Are students authorized to make repeated solo cross-country flights without each flight being logbook endorsed?

- A- No; each solo cross-country flight requires a logbook endorsement.
- B- Yes; provided the flights take place under stipulated conditions.
- C- Yes; but only if the flights remain within 25 NM of the point of departure.

3398. One requirement for a student pilot to be authorized to make a solo cross-country flight is an endorsement

- A- in the student's logbook that the instructor has given the student cross-country instruction in the model of aircraft to be used.
- B- in the student's logbook that the preflight planning and preparation has been reviewed and the student is prepared to make the flight safely.
- C- on the Student Pilot Certificate stating the student is competent to make cross-country flights in the category, class, and type of aircraft involved.

3399. May repeated solo cross-country flights over the same route be made by a student without receiving an endorsement from a flight instructor for each flight?

- A- No; an endorsement is required for each solo cross-country flight.
- B- Yes; if the route is no more than 50 NM from the point of departure and instruction was given in both directions over the route.
- C- Yes; if the total route is no more than 25 NM from the point of departure and the student has received at least 3 hours of cross-country instruction and logged at least 5 hours of solo cross-country flight.

3466. To operate an aircraft on a solo flight within a terminal control area, a student must have a logbook endorsement showing that he/she has

- A- received flight instruction from any authorized flight instructor on operating within a terminal control area.
- B- received ground instruction on and flight instruction in the specific terminal control area for which solo flight is authorized.
- C- within the preceding 90 days, been found to be competent by any flight instructor having knowledge of the student's experience.

3401. What night flight instruction is required for an unrestricted Private Pilot Certificate with an airplane rating?

- A- 3 hours at night, including 10 takeoffs and 10 landings.
- B- 1 hour at night, including five takeoffs and five landings.
- C- 1 hour at night, including three takeoffs and three landings.

3402. With respect to cross-country experience requirements in FAR Part 61, a private pilot-airplane applicant must have a minimum of

- A- 3 hours' dual and 5 hours' solo.
- B- 3 hours' dual and 10 hours' solo.
- C- 5 hours' dual and 10 hours' solo.

3403. What is the minimum age required to be eligible for a Recreational Pilot Certificate with an airplane rating?

- A- 17.
- B- 16.
- C- 14.

3464. To be eligible for a Recreational Pilot Certificate, one requirement is for the applicant to hold at least a current

- A- First-Class Medical Certificate.
- B- Second-Class Medical Certificate.
- C- Third-Class Medical Certificate.

3405. A recreational pilot with less than 400 hours' flight time may not act as pilot in command unless the pilot has

- A- logged pilot-in-command time in the last 90 days.
- B- logged pilot-in-command time in the last 180 days.
- C— received flight instruction from an instructor who certifies the pilot is competent to conduct flights beyond 50 miles.

3406. To act as pilot in command of an airplane in a passenger-carrying airlift sponsored by a charitable organization, a private pilot is required to have

- A- special authorization from the FAA.
- B- logged at least 200 hours of flight time.
- C- at least 100 hours of pilot-in-command time.

3407. What flight time is required for a Private Pilot Certificate with a helicopter rating?

- A- A minimum of 40 hours in helicopters with at least 15 hours of solo time.
- B- A minimum of 40 hours of flight time in aircraft with at least 15 hours of flight instruction in helicopters.
- C- A minimum of 40 hours of flight instruction and solo flight time in **aircraft** with at least 15 hours of solo time in helicopters.

3408. How much solo time in a gyroplane is required to be eligible for a Private Pilot Certificate with a gyroplane rating?

- A- 10 hours.
- B- 15 hours.
- C- 20 hours.

3409. **What** is the minimum age required to be eligible for a Commercial Pilot Certificate?

- A- 17.
- B- 16.
- c- 21.

3410. To be eligible for a Commercial Pilot Certificate, one of the requirements is for the applicant to hold at least a current

- A- First-Class Medical Certificate.
- B- Second-Class Medical Certificate.
- C- Third-Class Medical Certificate.

3411. As a pilot, how much flight time should an applicant have for a Commercial Pilot Certificate with an airplane rating?

- A- 250 hours.
- B- 200 hours.
- C- 150 hours.

3412. Under FAR Part 61, a commercial **pilot-airplane** applicant is required to have a minimum of how much cross-country experience?

- A- 30 hours.
- B- 40 hours.
- C- 50 hours.

3413. **What** limitation is imposed on a newly certificated commercial airplane pilot if that person does not hold an instrument pilot rating?

- A- The carrying of passengers for hire on cross-country flights of more than 50 NM or at night is prohibited.
- B- The carrying of passengers for hire on cross-country flights is limited to 50 NM for night flights, but not limited for day flights.
- C- The carrying of passengers or property for hire on cross-country flights is limited to 50 NM and the carrying of passengers for hire at night is prohibited.

3414. As pilot, how much flight time should an applicant have for a Commercial Pilot Certificate with a helicopter rating?

- A- 250 hours.
- B- 200 hours.
- C- 150 hours.

3415. As pilot, how much flight time should an applicant have for a Commercial Pilot Certificate with a gyroplane rating?

- A- 150 hours.
- B- 200 hours.
- C- 250 hours.

3416. An applicant for a Commercial Pilot Certificate with a glider rating must have at least

- A- 35 glider flights launched by ground tow or 20 launched by aerotow.
- B- 25 hours of pilot time, 20 hours in gliders and 100 glider flights as pilot in command, including 25 flights in which 360° turns were made.
- C- 200 hours of pilot time in heavier-than-air aircraft, including at least 10 glider flights as pilot in command during which 360° turns were made.

3417. What requirement must a certified airplane flight instructor meet in order to prepare an applicant for a Flight Instructor Certificate?

- A- Have logged a minimum of 100 hours of flight instructor time.
- B- Have held a Flight Instructor Certificate for at least 12 months immediately preceding the date the instruction is given.
- C- Have held a Flight Instructor Certificate for at least 24 months and given a minimum of 200 hours of flight instruction.

3418. **What** requirement must a certified glider flight instructor meet in order to prepare an applicant for a Flight Instructor Certificate with a glider rating?

- A- Have held a Flight Instructor Certificate for 24 months or given 200 hours of flight instruction.
- B- Have held a Flight Instructor Certificate for 12 months and given a minimum of 80 hours of instruction.
- C— Have held a Flight Instructor Certificate for at least 24 months and given a minimum of 80 hours of glider instruction.

3419. The type and date of each student pilot endorsement given shall be maintained by each flight instructor. For what period of time is this record required to be maintained?

- A- 6 months.
- B- 24 months.
- C- 36 months.

3420. A flight instructor who applies for an additional rating on that certificate must have a minimum of how many hours as pilot in command in the category and class of aircraft appropriate to the rating sought?

- A- 15.
- B- 10.
- G- 5.

3421. During any 24 consecutive hours, an instructor is limited to how many hours of flight time?

- A- 8.
- B- 10.
- c- 12.

3422. To endorse a student pilot for solo cross-country privileges, an instructor is required, in part, to have

- A- given that student the required cross-country flight instruction.
- B- assurance from another instructor that the student is prepared to conduct the flight safely.
- C- at least 5 hours of experience as pilot in command in the make and model aircraft involved.

3423. To endorse a student pilot's logbook for local solo flight, an instructor is required, in part, to have

- A- given that student cross-country flight instruction.
- B- given that student flight instruction in the type of aircraft involved.
- C- at least 5 hours of experience as pilot in command in the aircraft involved.

3424. Certain flight instruction is required for the issuance of a certificate. If that instruction is in a multiengine airplane, the instructor is required, in part, to have

- A- given at least 200 hours of flight instruction,
- B- given at least 100 hours of instruction in multiengine aircraft.
- C- at least 5 hours of experience as pilot in command in the make and model of aircraft involved.

3425. The minimum pilot-in-command time requirement for a flight instructor with multiengine privileges to give instruction to a student for a multiengine rating is

- A- 5 hours in the make and model of aircraft in which instruction is to be given.
- B- 10 hours in the make of aircraft in which the instruction is to be given.
- C- 15 hours in the make and model of aircraft in which instruction is to be given.

3426. The holder of an expired Flight Instructor Certificate may exchange that certificate for a new one by

- A- passing the appropriate practical test.
- B- presenting a satisfactory record of instruction.
- C- successfully completing a flight instructor refresher course.

3427. A Flight Instructor Certificate may be renewed by

- A- passing both a written and a practical test.
- B- successfully completing a flight instructor refresher course within 6 months prior to renewal.
- C- providing a record of instruction showing evidence the applicant is a competent flight instructor.

3428. If an in-flight emergency requires immediate action, a pilot in command may

- A- deviate from FAR's to the extent required to meet that emergency.
- B- not deviate from FAR's unless permission is obtained from air **traffic** control.
- C- deviate from FAR's to the extent required to meet the emergency, but must submit a written report to the Administrator within 24 hours.

3429. Under what condition, if any, may a pilot allow a person who is obviously under the influence of intoxicating liquors or drugs to be carried aboard an aircraft?

- A- Under no condition.
- B- Only if a second pilot is aboard.
- C- Only if the person is a medical patient under proper care or in an emergency.

3430. A person may not act as a crewmember of a civil aircraft if alcoholic beverages have been consumed by that person within the preceding

- A- 8 hours.
- B- 12 hours.
- C- 24 hours.

3431. No person may act as a crewmember of a civil aircraft with a minimum blood alcohol level of

- A- any detectable amount.
- B— .04** percent or greater.
- C- 0.2 percent or greater.

3432. An aircraft's operating limitations may be found in the

- A- FAA-approved aircraft flight manual.
- B- owner's handbook published by the aircraft manufacturer.
- C- aircraft flight manual, approved manual material, markings, and placards, or any combination thereof.

3433. In addition to other preflight action for a VFR cross-country flight, regulations specifically require the pilot in command to

- A- file a flight plan for the proposed flight.
- B- determine runway lengths at the airports of intended use.
- C- check the accuracy of the omninavigational equipment if the flight is to be made on airways.

3434. Which preflight action is required for every flight?

- A- Check weather reports and forecasts.
- B- Determine runway length at airports of intended use.
- C- Determine alternatives if the flight cannot be completed.

3435. The preflight action required by regulations relative to alternatives available, if the planned flight cannot be completed, is applicable to

- A- IFR flights only.
- B- any flight not in the vicinity of an airport.
- C- any flight conducted for hire or compensation.

3436. Which statement is true regarding the fastening of seatbelts?

- A- Seatbelts must be fastened about passengers and required crewmembers during takeoff and landing only.
- B- Seatbelts must be fastened about passengers during takeoff and landing only, while required flight crewmembers' seatbelts must be fastened during the entire flight.
- C- Seatbelts must be fastened about passengers during takeoff and landing only, while each required crewmember's **seatbelt** must be fastened at all times while occupying an assigned station.

3437. A pilot in a multiengine land airplane is planning to practice IFR procedures under a hood in VMC conditions. The safety pilot must have at least a

- A- Student Pilot Certificate.
- B- Private Pilot Certificate, with airplane multiengine land rating.
- C- Private Pilot Certificate with both airplane and instrument ratings.

3438. May an airplane be operated in formation flight while passengers are carried for hire?

- A- No; this is not authorized.
- B- Yes; if the passengers approve.
- C- Yes; provided arrangements have been made with the other pilot(s).

3439. If on a night flight, the pilot of airplane A observes only the green wingtip light of airplane B, and the airplanes are converging, which airplane has the right-of-way?

- A- Airplane A; it is to the left of airplane B.
- B- Airplane B; it is to the right of airplane A.
- C- Airplane A; it is to the right of airplane B.

3440. When two or more airplanes are approaching an airport for the purpose of landing, the right-of-way belongs to the airplane

- A- that is the least maneuverable.
- B- that is either ahead of or to the other's right regardless of altitude.
- C- at the lower altitude, but it shall not take advantage of this rule to cut in front of or to overtake another.

3441. What action should be taken if a glider and an airplane approach each other at the same altitude and on a head-on collision course?

- A- Both should give way to the right.
- B- The airplane should give way because it is more maneuverable.
- C- The airplane should give way because the glider has the right-of-way.

3442. When flying beneath the lateral limits of a terminal control area, the maximum indicated airspeed authorized is

- A- 156 knots.
- B- 200 knots.
- C- 250 knots.

3443. Unless otherwise authorized, what is the maximum speed at which a turbine-powered aircraft should be flown within an airport **traffic** area which is in a terminal control area?

- A- 156 knots.
- B- 200 knots.
- C- 250 knots.

3444. Unless otherwise authorized or required by air **traffic** control, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL?

- A- 156 knots.
- B- 200 knots.
- C- 250 knots.

3445. The maximum indicated airspeed permitted when operating an aircraft within an airport traffic area located outside a terminal control area is

- A- 156 knots.
- B- 200 knots.
- C- 250 knots.

3446. To operate an aircraft over any congested area, a pilot should maintain an altitude of at least

- A- 500 feet above the highest obstacle within a horizontal radius of 1,000 feet.
- B- 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet.
- C- 2,000 feet above the highest obstacle within a horizontal radius of 1,000 feet.

3447. The minimum distance at which an airplane may be operated over a structure which is located in a sparsely populated area is

- A- 500 feet above the ground.
- B- 500 feet from the structure.
- C- 1,000 feet from the structure.

3448. Except when necessary for takeoff or landing, what is the minimum safe altitude for a pilot to operate an aircraft anywhere?

- A- An altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet.
- B- An altitude of 500 feet above the surface and no closer than 500 feet to any person, vessel, vehicle, or structure.
- C- An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

3449. A helicopter may be operated at less than the minimum safe altitudes prescribed by regulations for other aircraft if

- A- the operation is conducted without hazard to persons or property.
- B- an altitude of at least 500 feet is maintained over other than congested areas.
- C- at least 500 feet is maintained above the highest obstacle within a radius of 1,000 feet.

3450. What action is appropriate if you deviate from an air **traffic** control instruction during an emergency and are given priority?

- A- Submit a report to the nearest FAA regional **office** within 48 hours.
- B- Submit a report to the manager of the air traffic control facility within 24 hours.
- C- If requested, submit a detailed report within 48 hours to the manager of the air traffic control facility.

3451. While in flight, a steady red light directed at you from the control tower means

- A- continue flight; airport unsafe, do not land.
- B- give way to other aircraft; continue circling.
- C- return for landing; expect steady green light at the appropriate time.

3452. While in flight, an alternating red and green light directed at you from the control tower means

- A- exercise extreme caution.
- B- give way to other aircraft, continue circling.
- C- return for landing; expect steady green light at proper time.

3453. You receive a flashing white light from the control tower during run-up prior to takeoff; what action should you take?

- A- Taxi clear of the runway in use.
- B- Return to your starting point on the airport.
- C- None; this light signal is applicable only to aircraft in flight.

3454. What is the correct departure procedure at a noncontrolled airport?

- A- The FAA-approved departure procedure for that airport.
- B- Make all left turns, except a 45° right turn on the first crosswind leg.
- C- Departure in any direction consistent with safety, after crossing the airport boundary.

3455. A turbine-powered or large airplane is required to enter an airport **traffic** area at an altitude of at least

- A- 1,000 feet AGL.
- B- 1,500 feet AGL.
- C- 2,000 feet AGL.

3456. An airport without a control tower lies within the airport traffic area of an airport that has an operating tower. According to regulations, air traffic control authorization is required to land at

- A- both airports, as well as to fly through the area.
- B- the tower-controlled airport only, as well as to fly through the area.
- C- the tower-controlled airport only, but not required to fly through the area.

3457. Which of the following is required for flight within a terminal control area?

- A- Private Pilot Certificate.
- B- Distance measuring equipment.
- C- A 4096 code transponder with automatic altitude reporting capability.

3458. Which statement is true regarding VFR operations in terminal control areas?

- A- An operating VOR is required.
- B- A Private Pilot Certificate is required for all flights within a terminal control area.
- C- Solo student pilots are authorized to fly within terminal control areas if they meet certain requirements.

3459. Which of the following equipment is required when operating an airplane within a terminal control area?

- A- A 4096 code transponder.
- B- A 4096 code transponder with altitude reporting capability.
- C- A VOR receiver and distance measuring equipment.

3460. In which type of airspace are VFR flights prohibited?

- A- Terminal control area.
- B- Positive control area.
- C- Continental Control Area.

3461. **What** is the minimum fuel requirement for flight under VFR at night in an airplane? Enough to fly to

- A- the first point of intended landing and to fly after that for 20 minutes at normal cruise speed.
- B- the first point of intended landing and to fly after that for 30 minutes at normal cruise speed.
- C- the first point of intended landing and to fly after that for 45 minutes at normal cruise speed.

3462. What is the minimum fuel requirement for flight under VFR during daylight hours in an airplane? Enough to fly to

- A- the first point of intended landing and to fly after that for 20 minutes at normal cruise speed.
- B- the first point of intended landing and to fly after that for 30 minutes at normal cruise speed.
- C- the first point of intended landing and to fly after that for 45 minutes at normal cruise speed.

3463. What is the minimum fuel requirement for flight under VFR in a rotorcraft? Enough to fly to

- A- the first point of intended landing and to fly after that for 20 minutes at normal cruise speed.
- B- the first point of intended landing and to fly after that for 30 minutes at normal cruise speed.
- C- the first point of intended landing and to fly after that for 45 minutes at normal cruise speed.

3464. **What** type airspeed at the planned cruise altitude should be entered on a flight plan?

- A- True airspeed.
- B- Indicated airspeed.
- C- Estimated groundspeed.

3465. An airplane may be operated in uncontrolled airspace at night below 1,200 feet above the surface under the following conditions:

- A- Clear of clouds and 1 mile visibility.
- B- Clear of clouds and 3 miles visibility.
- C- Less than 3 miles but more than 1 mile visibility in an airport **traffic** pattern and within one-half mile of the runway.

3466. During VFR operations outside controlled airspace at altitudes of less than 1,200 feet AGL, what is the minimum distance from clouds requirement?

- A- Remain clear of clouds.
- B- 500 feet above or 1,000 feet below and 2,000 feet horizontal.
- C- 500 feet above or 500 feet below and 1,000 feet horizontal.

3467. During operations within controlled airspace at altitudes of more than 1,200 feet AGL, but less than 10,000 feet MSL, the minimum horizontal distance from clouds requirement for VFR flight is

- A- 2,000 feet.
- B- 1,000 feet.
- C- 500 feet.

3468. While in uncontrolled airspace in VFR conditions, what distance from clouds should be maintained when flying more than 1,200 feet AGL, and at or above 10,000 feet MSL?

- A - 500 feet below; 1,000 feet above; 1 mile horizontal.
- B - 1,000 feet below; 1,000 feet above; 1 mile horizontal.
- C - 500 feet below; 1,000 feet above; 2,000 feet horizontal.

3469. While in controlled airspace in VFR conditions, what in-flight visibility is required when flying more than 1,200 feet AGL and at or above 10,000 feet MSL?

- A- 1 SM.
- B- 3SM.
- C- 5 SM.

3470. While in uncontrolled airspace in VFR conditions, what in-flight visibility is required when flying more than 1,200 feet AGL and less than 10,000 feet MSL?

- A- 5 SM.
- B- 3SM.
- C- 1 SM.

3471. When operating an airplane within a control zone under special VFR, the flight visibility is required to be at least

- A- 3 SM.
- B- 2 SM.
- C - **1 SM.**

3472. No person may operate an airplane within a control zone between sunset and sunrise under special VFR unless the

- A- flight visibility is at least 3 miles.
- B- airplane is equipped for instrument flight.
- C- flight can be conducted 500 feet below the clouds.

3473. Regulations stipulate that, at an airport located within a control zone and at which ground visibility is not reported, takeoffs and landings of airplanes under special VFR are

- A- not authorized.
- B- authorized if the flight visibility is at least 1 SM.
- C- authorized only if another airport in that control zone reports a ground visibility of 1 SM.

3474. Which is required to operate a helicopter within a control zone between sunset and sunrise under special VFR?

- A- The pilot must possess an instrument rating and have satisfied currency requirements.
- B—** The helicopter must be equipped for instrument flight and the visibility must be at least 1 mile.
- C- The helicopter must be operated at a speed that allows the pilot the opportunity to see and avoid other **traffic** or obstructions.

3475. May a helicopter operate in a control zone at night under special VFR?

- A- Yes; regulations permit this.
- B- No; this is permitted for airplanes only.
- C- Yes; but the pilot must be instrument rated and the helicopter must be instrument equipped.

3476. When operating under VFR at more than 3,000 feet AGL, cruising altitudes to be maintained are based upon the

- A- true course being flown.
- B- magnetic course being flown.
- C- magnetic heading being flown.

3477. Which courses and altitudes are appropriate for VFR aircraft operating more than 3,000 feet AGL, but below 18,000 feet MSL?

- A- True course 0° to 179° inclusive, odd thousands plus 500 feet.
- B- Magnetic course **0°** to 179° inclusive, even thousands plus 500 feet.
- C- Magnetic course **180°** to **359°** inclusive, even thousands plus 500 feet.

3478. Regarding certificates and documents, no person may operate an aircraft unless it has within it an

- A- Airworthiness Certificate and minimum equipment list (MEL).
- B- Airworthiness Certificate, **aircraft** and engine logbooks, and owner's handbook.
- C- Airworthiness Certificate, Registration Certificate, and approved flight manual.

3479. Which is required equipment for powered aircraft during VFR night flights?

- A- Anticollision light system.
- B- Appropriate radio navigational equipment.
- C- Artificial horizon and rate-of-turn indicator.

3480. When conducting VFR operations at night for hire, aircraft must be equipped with at least

- A- a sensitive altimeter.
- B- one electric landing light.
- C- a flashing strobe on the vertical stabilizer.

3481. When an aircraft is being flown over water, under what circumstance must approved flotation gear be readily available to each occupant?

- A- At night and over water beyond gliding distance from shore.
- B- Anytime the aircraft, is beyond power-off gliding distance from shore.
- C- When operating for hire beyond power-off gliding distance from shore.

3482. What is the maximum distance from an airport that an aircraft engaged in training operations may be operated without an emergency locator transmitter?

- A- 50 NM.
- B- 25 NM.**
- C- 10 NM.

3483. How long may an aircraft be operated after the emergency locator transmitter has been initially removed for maintenance?

- A- 90 days.
- B- 30 days.
- C- 7 days.

3484. When are emergency locator transmitter batteries required to be replaced or recharged?

- A- Every 24 months.
- B- **After** 1 cumulative hour of use.
- G- **After** 75 percent of their useful life has expired.

3485. From sunset to sunrise, no person may park or move an aircraft in a night-flight operations area of an airport unless the aircraft

- A- is in an area marked by obstruction lights.
- B- is equipped with an electric landing or taxi light.
- C- has lighted aviation red or white anticollision lights.

3486. Position lights are required to be displayed on all aircraft in flight from

- A- sunset to sunrise.
- B- 1 hour before sunset to 1 hour **after** sunrise.
- C- 30 minutes before sunrise to 30 minutes **after** sunset.

3487. Unless each occupant is provided with supplemental oxygen, no person may operate a civil aircraft of U.S. registry above a cabin pressure altitude of

- A- 12,500 feet MSL.
- B- 14,000 feet MSL.
- C- 15,000 feet MSL.

3488. Which cabin pressure altitude allows a pilot to operate an aircraft up to 30 minutes without supplemental oxygen?

- A- 15,000 feet MSL.
- B- 14,500 feet MSL.
- C- 12,500 feet MSL.

3489. The primary purpose of a minimum equipment list (MEL) is to

- A- provide a list of equipment that must be operational at all times on the aircraft.
- B- list the equipment that can be inoperative and still not affect the airworthiness of an aircraft.
- C- list the minimum equipment that must be installed in all aircraft as required by airworthiness directives.

3499. Authority for approval of a minimum equipment list (MEL) must be obtained from the

- A- Administrator.
- B- FAA district office.
- C- aircraft manufacturer.

3491. How long before the proposed operation should a request be submitted to the controlling ATC facility to operate in an airport radar service area without the required altitude reporting transponder?

- A- 1 hour.
- B- 8 hours.
- C- 24 hours.

3492. A coded transponder with altitude reporting capability is required for all controlled airspace

- A- below 14,500 feet MSL.
- B- above 12,500 feet MSL (excluding airspace at or below 2,500 feet **AGL**).
- C- at and above 10,000 feet MSL (excluding airspace at or below 2,500 feet **AGL**).

3493. An altitude reporting coded transponder is required for all airspace

- A- from the surface to 10,000 feet MSL within a 10 NM radius of any airport traffic area.
- B- at and above 10,000 feet MSL and below the floor of the positive control area (excluding airspace at or below 2,500 feet **AGL**).
- C- within 25 NM of a terminal control area primary airport from the surface upward to 10,000 feet MSL (excluding airspace below 1,200 feet AGL).

3494. What are the requirements, if any, to overfly an airport radar service area (**ARSA**)?

- A- None, provided the flight remains above the **ARSA** ceiling.
- B- Two-way radio and transponder with automatic altitude reporting capability are required above the ARSA ceiling and upward to 10,000 feet MSL.
- C- Two-way radio communications must be established with ATC and transponder must be operating at all times.

3496. Which operable equipment is required for operating a helicopter in an airport radar service area?

- A- Two-way radio.
- B- Two-way radio and transponder with automatic altitude reporting capability.
- C- Two-way radio, VOR, and transponder with automatic altitude reporting capability.

3499. What is the minimum altitude required for acrobatic flight?

- A- 1,500 feet AGL.
- B- 2,000 feet MSL.
- C- 3,000 feet AGL.

3497. What is the minimum flight visibility required for acrobatic flight?

- A- 5 miles.
- B- 3 miles.
- C- 1 mile.

3498. When must each occupant of an aircraft wear an approved parachute?

- A- When flying over water beyond gliding distance to the shore.
- B- When practicing spins or other flight maneuvers for any certificate or rating.
- C- When an intentional maneuver that exceeds 30° **noseup** or **nosedown** relative to the horizon is made.

3499. Which of the following is required to operate an aircraft towing an advertising banner?

- A- Approval from ATC to operate in a control area.
- B- A record of training in towing for the pilot in command.
- C- A certificate of waiver issued by the Administrator.

3500. Who is responsible for ensuring that an aircraft airworthiness directive is complied with?

- A- The owner or operator of the aircraft.
- B- The airworthiness inspector from the local FAA district **office**.
- C- Maintenance personnel responsible for the **100-hour** inspection or annual inspection.

3501. Completion of an annual inspection and the return of an aircraft to service should always be indicated by

- A- conduct of a test flight and the appropriate logbook entry.
- B- the appropriate entries in the aircraft maintenance records.
- C- the relicensing date on the Registration Certificate.

3502. If an aircraft's operation in flight was substantially affected by an alteration or repair, the aircraft documents must show that it was test flown and approved for return to service by an appropriately rated pilot prior to being flown

- A- with passengers aboard.
- B- for compensation or hire.
- C- away from the vicinity of the airport.

3503. An aircraft's last annual inspection was performed on July 12, this year. The next annual inspection will be due no later than

- A- July 13, next year.
- B- July 31, next year.
- C- 12 calendar months after the date shown on the Airworthiness Certificate.

3504. Which operation is prohibited if the aircraft being used has not had a **100-hour** inspection or annual inspection within the preceding 100 hours of time in service?

- A- Giving flight instruction for hire.
- B- Conducting any commercial operation.
- C- Carrying passengers, either for hire or not for hire.

3505. An aircraft operated for hire with passengers aboard has a **100-hour** inspection performed after 90 hours in service. The next **100-hour** inspection would be due after

- A- 90 hours' time in service.
- B— 100 hours' time in service.
- C- 110 hours' time in service.

3506. If an ATC transponder installed in an aircraft has not been tested, inspected, and found to comply with regulations within a specified period, what is the limitation on its use?

- A- Its use is not permitted.
- B- It may be used anywhere except in terminal control areas.
- C- It may be used for VFR flight but not for IFR flight.

3507. What is the maximum time period during which a person may use an ATC transponder after it has been tested and inspected?

- A- 12 calendar months.
- B- 24 calendar months.
- C- 36 calendar months.

3508. Unless equipped with a life preserver or an approved flotation device for each occupant, no person may take off in a large or turbine-powered multiengine airplane for a flight over water of more than

- A- 50 NM from the nearest shoreline.
- B- 100 NM from the nearest shoreline.
- C- 30 minutes' flying time from the nearest shoreline.

3509. In addition to the items required by FAR Part 91, Subpart A, the pilot in command shall ensure that a large airplane has on board, and within access,

- A- a cockpit checklist.
- B- a complete set of IFR navigation charts.
- C- a flashlight having at least three size "D" cells.

3510. The NTSB defines a serious injury as any injury which

- A- causes severe tendon damage.
- B- results in a simple fracture of the nose.
- C— involves first degree burns over 5 percent of the body.

3511. Notification to the NTSB is required when there has been substantial damage which

- A- adversely affects aircraft performance.
- B- causes small punctured holes in the skin or fabric.
- C- results in more than \$25,000 for repairs to the aircraft.

3512. NTSB Part 830 requires an immediate notification as a result of which incident?

- A- Aircraft collide on the ground.
- B- Flight control system malfunction.
- C- Damage to property, other than the aircraft, estimated to exceed \$10,000.**

3613. If an aircraft is involved in an accident which results in substantial damage to the aircraft, the nearest NTSB field **office** shall be notified

- A- immediately.
- B- within 7 days.
- C- within 10 days.

3514. The operator of an aircraft that has been involved in an accident is required to file a report within how many days?

- A- 3.
- B- 7.
- c- 10.

3515. The operator of an aircraft that has been involved in an incident is required to submit a report to the nearest field **office** of the NTSB

- A- within 7 days.
- B- within 10 days.
- C- only if requested to do so.

3516. The use of a slot in the leading edge of the wing enables the airplane to land at a slower speed because it

- A- changes the camber of the wing.
- B- delays the stall to a higher angle of attack.
- C- decelerates the upper surface boundary layer air.

3517. The tendency of an aircraft to develop forces which restore it to its original condition, when disturbed from a condition of steady flight, is known as

- A- stability.
- B- controllability.
- C- maneuverability.

3518. Rotor blade rotation during powered flight in a gyroplane is produced by the

- A- horizontal component of rotor lift.
- B- interaction between engine propeller thrust and rotor blade drag.
- C- transfer of engine power through the clutch to the rotor **shaft**.

3519. Why does increasing speed also increase lift?

- A- The increased velocity of the relative wind overcomes the increased drag.
- B- The increased impact of the relative wind on the wing's lower surface creates a greater amount of air being deflected downward.
- C- The increased speed of the air passing over the airfoil's upper surface increases the pressure, thus creating a greater pressure differential between the upper and lower surface.

3520. The three axes of an aircraft intersect at the

- A- center of gravity.
- B- center of pressure.
- C- midpoint of the mean chord.

3521. An airplane would have a tendency to nose up and have an inherent tendency to enter a stalled condition when the center of pressure is

- A- below the center of gravity.
- B- aft of the center of gravity.
- C- forward of the center of gravity.

3522. When considering the forces acting upon an airplane in straight-and-level flight at constant airspeed, which statement is correct?

- A- Weight always acts vertically toward the center of the Earth.
- B- Thrust always acts forward parallel to the relative wind and is greater than drag.
- C- Lift always acts perpendicular to **the** longitudinal axis of the wing and is greater than weight.

3523. Adverse yaw during a turn entry is caused by

- A- increased induced drag on the lowered wing and decreased induced drag on the raised wing.
- B- decreased induced drag on the lowered wing and increased induced drag on the raised wing.
- C- increased parasite drag on the raised wing and decreased parasite drag on the lowered wing.

3524. When rolling out of a steep-banked turn, what causes the lowered aileron **to** create more drag than when rolling into the turn?

- A- **The** wing's angle of attack is greater as the **rollout** is started.
- B- The wing being raised is traveling faster through the air than the wing being lowered.
- C- The wing being lowered is traveling faster through the air and producing more lift than the wing being raised.

3525. How can a pilot increase the rate of turn and decrease the radius at the same time?

- A- Shallow the bank and increase airspeed.
- B- Steepen the bank and decrease airspeed.
- C- Steepen the bank and increase airspeed.

3526. Which statement is true concerning the aerodynamic conditions which occur during a spin entry?

- A- After a full stall, both wings remain in a stalled condition throughout the rotation.
- B- After a partial stall, the wing that drops remains in a stalled condition while the rising wing regains and continues to produce lift, causing the rotation.
- C- After a full stall, the wing that drops continues in a stalled condition while the rising wing regains and continues to produce some lift, causing the rotation.

3527. The point on an airfoil through which lift acts is the

- A- center of gravity.
- B- center of pressure.
- C- midpoint of the chord.

3528. Lift produced by an airfoil is the net force developed perpendicular to the

- A- chord.
- B- relative wind.
- C- longitudinal axis of the aircraft.

3529. The angle between the chord line of the wing and the longitudinal axis of the airplane is known as

- A- dihedral.
- B- the angle of attack.
- C- the angle of incidence.

3530. The angle between the chord line of an airfoil and the relative wind is known as the angle of

- A- lift.
- B- attack.
- C—** incidence.

3531. A line drawn from the leading edge to the trailing edge of an airfoil and equidistant at all points from the upper and lower contours is called the

- A- chord line.
- B—** camber line.
- C- mean camber line.

3532. The force which imparts a change in the velocity of a mass is called

- A- work.
- B- power.
- C- thrust.

3533. During a steady climb, the rate of climb depends on

- A- excess power.
- B- excess thrust.
- C- thrust available.

3534. During a steady climb, the angle of climb depends on

- A- excess thrust.
- B- power available
- C- thrust required.

3535. Which statement relates to Bernoulli's principle?

- A- For every action there is an equal and opposite reaction.
- B- An additional upward force is generated as the lower surface of the wing deflects air downward.
- C- Air traveling faster over the curved upper surface of an airfoil causes lower pressure on the top surface.

3536. An airplane wing is designed to produce lift resulting from relatively

- A- positive air pressure below and above the wing's surface.
- B- negative air pressure below the wing's surface and positive air pressure above the wing's surface.
- C- positive air pressure below the wing's surface and negative air pressure above the wing's surface.

3537. During flight with zero angle of attack, the pressure along the upper surface of the wing would be

- A- equal to atmospheric pressure.
- B- less than atmospheric pressure.
- C- greater than atmospheric pressure.

3538. That portion of the aircraft's total drag created by the production of lift is called

- A- induced drag, and is not affected by changes in airspeed.
- B- induced drag, and is greatly affected by changes in airspeed.
- C- parasite drag, and is greatly affected by changes in airspeed.

3539. As airspeed increases in level flight, total drag of the aircraft becomes greater than the total drag produced at the maximum lift/drag speed because of the

- A- increase in induced drag.
- B- decrease in induced drag.
- C- increase in parasite drag.

3540. As airspeed decreases in level flight, total drag of the aircraft becomes greater than the total drag produced at the maximum lift/drag speed because of the

- A- decrease in induced drag.
- B- increase in induced drag.
- C- increase in parasite drag.

3541. The resistance, or skin friction, due to the viscosity of the air as it passes along the surface of the wing is called

- A- form drag.
- B- profile drag.
- C- parasite drag.

3542. Which relationship is correct when comparing drag and airspeed?

- A- Induced drag increases as the square of the airspeed.
- B- Induced drag varies inversely as the square of the airspeed.
- C- Profile drag varies inversely as the square of the airspeed.

3543. Which statement describes the relationship of the forces acting on an aircraft in a constant-power and constant-airspeed descent?

- A- Thrust is equal to drag; lift is equal to weight.
- B- Thrust is equal to drag; weight is greater than lift.
- C- Thrust is greater than drag; weight is greater than lift.

3544. Which statement is true regarding the forces acting on an aircraft in a steady-state climb?

- A- The sum of all forward forces is greater than the sum of all rearward forces.
- B- The sum of all upward forces is greater than the sum of all downward forces.
- C- The sum of all upward forces is equal to the sum of all downward forces.

3545. As the angle of bank is increased, the vertical component of lift

- A- increases and the sink rate increases.
- B- decreases and the sink rate increases.
- C- increases and the sink rate decreases.

3546. Changes in the center of pressure of a wing affect the aircraft's

- A- lift/drag ratio.
- B- lifting capacity.
- C- aerodynamic balance and controllability.

3547. What action is necessary to make an airplane turn?

- A- Yaw the airplane.
- B- Change the direction of **lift**.
- C- Change the direction of thrust.

3548. The angle of attack of a wing directly controls the

- A- angle of incidence of the wing.
- B- amount of airflow above and below the wing.
- C- distribution of positive and negative pressure acting on the wing.

3549. The angle of attack at which an aircraft stalls

- A- increases with an increase in engine power.
- B- remains constant regardless of gross weight.
- C- varies with gross weight and density altitude.

3550. Which statement is true relating to the factors which produce stalls?

- A- The critical angle of attack is a function of the degree of bank.
- B- The stalling angle of attack depends upon the speed of the airflow over the wings.
- C- The stalling angle of attack is independent of the speed of airflow over the wings.

3551. The critical angle of attack at which a given airplane stalls is dependent on the

- A- gross weight.
- B- design of the wing.
- C- attitude and airspeed.

3552. If the same angle of attack is maintained in ground effect as when out of ground effect, **lift** will

- A—** increase, and induced drag will decrease.
- B- decrease, and parasite drag will increase.
- C- decrease, and parasite drag will decrease.

3553. Which of the following is a result, of ground effect?

- A- An increase in lift with no increase in angle of attack.
- B- An increase in induced drag with no change in angle of attack.
- C- An increase in the wing's **downwash** with no increase in angle of attack.

3554. It is possible to fly an airplane just clear of the ground at a slightly slower airspeed than that required to sustain level flight at higher altitudes. This is the result of

- A- interference of the ground surface with the airflow patterns about the airplane in flight.
- B- a cushioning effect of the air as it is trapped between the ground and the descending airplane.
- C- ground interference with the static pressure system which produces false indications on the airspeed indicator.

3555. An airplane leaving ground effect will

- A- experience a decrease in thrust required.
- B- experience a decrease in stability and a **noseup** change in moments.
- C- require a lower angle of attack to attain the same lift coefficient.

3556. An airplane is usually affected by ground effect at what height above the surface?

- A- Three to four times the airplane's wingspan.
- B- Twice the airplane's wingspan above the surface.
- C- Less than half the airplane's wingspan above the surface.

3557. If severe turbulence is encountered, the airplane's airspeed should be reduced to

- A- maneuvering speed.
- B—** normal structural cruising speed.
- C- the minimum steady flight speed in the landing configuration.

3558. If an airplane's gross weight is 3,250 pounds, what is the load acting on this airplane during a level 60° banked turn?

- A- 3,250 pounds.
- B- 5,200 pounds.
- C- 6,500 pounds.

3559. An airplane has a normal stalling speed of 60 MPH but is forced into an accelerated stall at twice that speed. What maximum load factor will result from this maneuver?

- A- 4 G's.
- B- 2 G's.
- C - 1 G.

3560. (Refer to figure 18.) A positive load factor of 4 at 140 MPH would cause the airplane to

- A- stall.
- B- break apart.
- C- be subjected to structural damage.

3561. (Refer to figure 18.) What load factor would be created if positive 30 feet per second gusts were encountered at 130 MPH?

- A- 3.8.
- B- 3.0.
- c- 2.0.

3562. (Refer to figure 18.) The horizontal dashed line from point B to point D represents the

- A- positive limit load factor.
- B- airspeed range for normal operations.
- C- maximum structural cruise airspeed range.

3563. (Refer to figure 18.) The airspeed indicated by point B is

- A - V_A .
- B - V_{NE} .
- c - V_{NO} .

3564. (Refer to figure 18.) The airspeed indicated by point D is

- A - V_A .
- B - V_{NE} .
- c - V_{NO} .

3565. (Refer to figure 18.) The airspeed indicated by point C is

- A - V_A .
- B - V_{NE} .
- c - V_{NO} .

3566. (Refer to figure 19.) What increase in load factor would take place if the angle of bank were increased from 60° to 80° ?

- A- 2 G's.
- B— 3 G's.**
- G - 4 4 s .

3567. (Refer to figure 19.) What is the stall speed of an airplane under a load factor of 4 if the unaccelerated stall speed is 70 knots?

- A- 91 knots.
- B- 132 knots.
- C— 140 knots.**

3566. (Refer to figure 19.) If, during a steady turn with a 50° bank, a load factor of 1.5 were imposed on an airplane which has an unaccelerated stall speed of 60 knots, at what speed would the airplane first stall?

- A- 68 knots.
- B- 75 knots.
- C— 82 knots.**

3569. (Refer to figure 19.) A 70 percent increase in stalling speed would imply a bank angle of

- A- 67° .
- B- 70° .
- C- 83° .

3670. (Refer to figure 19.) What is the stall speed of an airplane under a load factor of 2 if the unaccelerated stall speed is 100 knots?

- A- 115 knots.
- B- 129 knots.
- c- 140 knots.

3571. (Refer to figure 20.) Which statement is true regarding airplane flight at L/D_{max} ?

- A- Any angle of attack other than that for L/D_{max} increases parasite drag.
- B- Any angle of attack other than that for L/D_{max} increases the lift/drag ratio.
- C- Any angle of attack other than that for L/D_{max} increases total drag for a given airplane's lift.

3572. (Refer to figure 20.) The **lift** and drag at **2°** angle of attack is approximately the same as the **lift** and drag for

- A- 9.75° angle of attack.
- B- 10.5° angle of attack.
- C- 16.5° angle of attack.

3573. (Refer to figure 20.) At which angle of attack does the airplane travel the maximum horizontal distance per foot of altitude lost?

- A- 6°.
- B— 12.3°.**
- G- 20°.

3574. Which action will result in a stall?

- A- Flying at too low an airspeed.
- B— Raising the airplane's nose too high.**
- C- Exceeding the critical angle of attack.

3575. (Refer to figure 21.) At the airspeed represented by point A, in steady flight, the aircraft will

- A- have its maximum **lift/drag** ratio.
- B- have its minimum **lift/drag** ratio.
- C- be developing its maximum coefficient of lift.

3576. (Refer to figure 21.) At an airspeed represented by point B, in steady flight, the pilot can expect to obtain the aircraft's

- A- maximum coefficient of **lift**.
- B- minimum coefficient of lift.
- C- maximum glide range in still air.

3577. Which aircraft characteristics contribute to spiral instability?

- A- Weak static directional stability and weak dihedral effect.
- B- Strong static directional stability and weak dihedral effect.
- C- Weak static directional stability and strong dihedral effect.

3578. The most desirable type of stability for an aircraft to possess is

- A- neutral static stability.
- B- positive static stability.
- C- positive dynamic stability.

3579. The tendency of an aircraft to develop forces that further remove the airplane from its original position, when disturbed from a condition of steady flight, is known as

- A- static instability.
- B- dynamic instability.
- C— positive static stability.**

3580. If the aircraft's nose initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays

- A- positive static stability.
- B- neutral dynamic stability.
- C— negative dynamic stability.**

3581. If the aircraft's nose initially tends to move farther from its original position after the elevator control is pressed forward and released, the **aircraft** displays

- A- negative static stability.
- B- positive static stability.
- C— positive dynamic stability.**

3582. **The** quality of an airplane that permits it to be operated easily and to withstand the stresses imposed on it is

- A- stability.
- B- maneuverability.
- C- controllability.

3583. **The** capability of an airplane to respond to the pilot's inputs, especially with regard to flightpath and attitude, is

- A- response.
- B- controllability.
- C- maneuverability.

3584. If the aircraft's nose remains in the new position after the elevator control is pressed forward and released, the aircraft displays

- A- neutral static stability.
- B- negative static stability.
- C— positive static stability.**

3595. If the airspeed increases and decreases during longitudinal phugoid oscillations, the aircraft

- A- will display poor trimming qualities.
- B- can be easily controlled by the pilot.
- C—** is constantly changing angle of attack making it **difficult** for the pilot to reduce the magnitude of the oscillations.

3586. If an aircraft has negative dynamic and positive static stability, this will result in

- A- undamped oscillations.
- B- divergent oscillations.
- C- convergent oscillations.

3587. If an increase in power tends to make the nose of the aircraft rise, this is the result of the

- A- line of thrust being below the center of gravity.
- B- center of lift being ahead of the center of gravity.
- C- center of lift and center of gravity being collocated.

3598. Which subsonic **planform** provides the best lift coefficient?

- A- Tapered wing.
- B- Elliptical wing.
- C- Rectangular wing.

3589. On which wing **planform** does the stall begin at the wingtip and progress inward toward the wing root?

- A- Sweepback wing.
- B- Elliptical wing.
- C- Moderate taper wing.

3590. A rectangular wing, as compared to other wing planforms, has a tendency to stall first at the

- A- wingtip providing adequate stall warning.
- B- wing root providing adequate stall warning.
- C- wingtip providing inadequate stall warning.

3591. The purpose of aircraft wing dihedral angle is to

- A- increase lateral stability.
- B- increase longitudinal stability.
- C- increase lift **coefficient** of the wing.

3592. Aspect ratio of a wing is defined as the ratio of the

- A- wingspan to the wing root.
- B- wingspan to the mean chord.
- C- square of the chord to the wingspan.

3593. A wing with a very high aspect ratio (in comparison with a low aspect ratio wing) will have

- A- a low stall speed.
- B—** increased drag at high angles of attack.
- C- poor control qualities at low airspeeds.

3594. At a constant velocity in airflow, a high aspect ratio wing will have (in comparison with a low aspect ratio wing)

- A- increased drag, especially at a low angle of attack.
- B- decreased drag, especially at a high angle of attack.
- C—** increased drag, especially at a high angle of attack.

3595. (Refer to figure 22.) Which aircraft has the highest aspect ratio?

- A- 2.
- B- 3.
- c - 4.

3596. (Refer to figure 22.) Which aircraft has the lowest aspect ratio?

- A- 2.
- B- 3.
- c - 4.

3597. (Refer to figure 22.) Consider only aspect ratio (other factors remain constant). Which aircraft will generate greatest lift?

- A- 1.
- B- 2.
- c - 3.

3598. (Refer to figure 22.) Consider only aspect ratio (other factors remain constant). Which aircraft will generate greatest drag?

- A- 1.
- B- 3.
- c - 4.

3599. (Refer to figure 23.) While rolling into a right turn, if the inclinometer appears as illustrated in A, the HCL and CF vectors would be acting on the aircraft as illustrated in

- A- 2, and more left rudder pressure is needed to center the ball.
- B- 2, and more right rudder pressure is needed to center the ball.
- C- 4, and more right rudder pressure is needed to center the ball.

3600. (Refer to figure 23.) While rolling into a right turn, if the inclinometer appears as illustrated in C, the HCL and CF vectors would be acting on the aircraft as illustrated in

- A- 3, and less right rudder pressure is needed to center the ball.
- B- 5, and less right rudder pressure is needed to center the ball.
- C- 5, and more right rudder pressure is needed to center the ball.

3601. (Refer to figure 23.) While rolling out of a left turn, if the inclinometer appears as illustrated in A, the HCL and CF vectors would be acting on the aircraft as illustrated in

- A- 4, and more right rudder pressure is needed to center the ball.
- B- 4, and more left rudder pressure is needed to center the ball.
- C- 2, and more right rudder pressure is needed to center the ball.

3602. As a result of gyroscopic precession, it can be said that any

- A- pitching around the lateral axis results in a rolling moment.
- B- yawing around the vertical axis results in a pitching moment.
- C—** pitching around the longitudinal axis results in a yawing moment.

3603. Propeller slip is the difference between the

- A- geometric pitch and blade angle of the propeller.
- B- geometric pitch and the effective pitch of the propeller.
- C- plane of rotation of the propeller and forward velocity of the airplane.

3604. The distance a propeller actually advances in one revolution is

- A- twisting.
- B- effective pitch.
- C- geometric pitch.

3605. Blade angle of a propeller is defined as the angle between the

- A- angle of attack and chord line.
- B- chord line and plane of rotation.
- C—** angle of attack and line of thrust.

3606. A propeller rotating clockwise, as seen from the rear, creates a spiraling slipstream that tends to rotate the aircraft to the

- A- right around the vertical axis, and to the left around the longitudinal axis.
- B- left around the vertical axis, and to the right around the longitudinal axis.
- C- left around the vertical axis, and to the **left** around the longitudinal axis.

3607. The reason for variations in geometric pitch (twisting) along a propeller blade is that it

- A- prevents the portion of the blade near the hub to stall during cruising flight.
- B- permits a relatively constant angle of attack along its length when in cruising flight.
- C- permits a relatively constant angle of incidence along its length when in cruising flight.

3608. With regard to gyroscopic precession, when a force is applied at a point on the rim of a spinning disc, the resultant force acts in which direction and at what point?

- A- In the same direction as the applied force, **90°** ahead in the plane of rotation.
- B- In the opposite direction of the applied force, 90° ahead in the plane of rotation.
- C- In the opposite direction of the applied force, at the point of the applied force.

3609. The critical engine *on* most light multiengine airplanes with clockwise rotating propellers is the

- A- left engine, because of the P-factor of the **left** propeller.
- B- right engine, because of the P-factor of the left propeller.
- C- left engine, because of the P-factor of the right propeller.

3610. In a multiengine airplane with engines which rotate clockwise, the critical engine is the

- A- left engine, because the right engine center of thrust is closer to the centerline of the fuselage.
- B- right engine, because the left engine center of thrust is closer to the centerline of the fuselage.
- C- left engine, because the right engine center of thrust is farther away from the centerline of the fuselage.

3611. On a multiengine airplane, where the propellers rotate in the same direction, why is the loss of power on one engine more critical than the loss of power on the other engine?

- A- The corkscrew pattern of airflow from one propeller is less effective against the airflow from the critical engine.
- B- The torque reaction from operation of the critical engine is more severe around the vertical axis as well as the longitudinal axis.
- C- The asymmetric propeller thrust or P-factor results in the center of thrust from one engine being farther from the airplane centerline than the center of thrust from the other engine.

3612. The rotor blade pitch angle is the acute angle between the blade chord line and the

- A- angle of attack.
- B- rotor plane of rotation.
- C- direction of the relative wind.

3613. Rotor blade flapping action is

- A- an aerodynamic reaction to high-speed flight only.
- B- a desirable design feature which compensates for dissymmetry of lift.
- C- an undesirable reaction to changes in airspeed and blade angle of attack.

3614. In forward flight and with the blade-pitch angle constant, the increased lift on the advancing blade will cause it to

- A- flap up, causing a decrease in the angle of attack.
- B- flap up, causing an increase in the angle of attack.
- C- flap down, causing a decrease in the angle of attack.

3615. In certain single-rotor helicopters, the mast is rigged away from the vertical position by approximately **1°**. This slight vertical offset is primarily for the purpose of counteracting

- A- yaw.
- B- drift.
- C- torque.

3616. Coning is caused by the combined forces of

- A- gravity and thrust.
- ~~B—~~ lift and centrifugal force.
- C- weight and centrifugal force.

3617. As each blade flaps up and down, it produces a shift of the center of its mass. When the blade flaps up, the CG moves closer to its axis of rotation, giving that blade a tendency to

- A- accelerate its rotational velocity; this tendency is known as Coriolis effect.
- B- stabilize its rotational velocity, thus compensating for dissymmetry of lift.
- C- decelerate its rotational velocity; this tendency is known as translating tendency.

3618. The forward speed of a rotorcraft is restricted primarily by

- A- dissymmetry of lift.
- B- transverse flow effect.
- C- high-frequency vibrations.

3619. What is dissymmetry of **lift**?

- A- The difference in lift that exists between the advancing blade half and the retreating blade half of the disc area.
- B- The difference in lift that exists between the rearward part and the forward part of the rotor disc during forward flight.
- C- A term used to differentiate between air flowing downward through the rotor in powered flight and upward through the rotor in autorotative flight.

3620. During forward cruising flight at constant airspeed and altitude, the individual rotor blades, when compared to each other, are operating at

- A- unequal airspeed, equal angles of attack, and unequal lift moment.
- B- unequal airspeed, unequal angles of attack, and equal lift moment.
- C- constant airspeed, unequal angles of attack, and unequal lift moment.

3621. When a rotorcraft transitions from straight-and-level flight into a 30° bank while maintaining a constant altitude, the total lift force must

- A- increase, and the load factor will decrease.
- B- increase, and the load factor will increase.
- C—** remain constant, and the load factor will increase.

3622. The rotor RPM may momentarily increase during the flare portion of a flare-type autorotation. This increase in rotor RPM is due to

- A- an increased **downwash** velocity.
- B- a decrease in rotor drag brought about by a lack of forward motion.
- C- the additional lift derived from the increased angle of attack of the main rotor disc.

3623. Which statement is generally true regarding wing camber of a glider's airfoil?

- A- There is no camber on either the upper or lower surface of the wing.
- B- The camber is the same on both the upper and lower surface of the wing.
- C- The camber is greater on the upper wing surface than it is on the lower surface of the wing.

3624. In comparing a straight wing and a sweptback wing of the same wing area and wing loading, the sweptback wing has the advantage of

- A- lower stalling speed.
- B- higher critical Mach number.
- C- increased longitudinal stability.

3625. Which adverse stability characteristic is caused by sweepback?

- A- Increase of Mach tuck tendency.
- B- Increase of Dutch roll tendency.
- C- Increase of longitudinal static stability.

3626. Excessively high engine temperatures, either in the air or on the ground, will

- A- increase fuel consumption and may increase power due to the increased heat.
- B- result in damage to heat-conducting hoses and warping of the cylinder cooling fans.
- C- cause loss of power, excessive oil consumption, and possible permanent internal engine damage.

3627. If the engine oil temperature and cylinder head temperature gauges have exceeded their normal operating range, you may have been

- A- operating with the mixture set too rich.
- B- using fuel that has a higher-than-specified fuel rating.
- C—** operating with too much power and with the mixture set too lean.

3628. To properly purge water from the fuel system of an airplane equipped with fuel tank sumps and a fuel strainer quick drain, it is necessary to drain fuel from the

- A- fuel strainer drain only.
- B- lowest point in the fuel system only.
- C—** fuel strainer drain and the fuel tank sumps.

3629. If the grade of fuel used in an aircraft engine is lower than specified for the engine, it will most likely cause

- A- detonation.
- B- lower cylinder head temperatures.
- C- an increase in power which could overstress internal engine components.

3630. What is the main reason that fuel tank vents must be open?

- A- To allow proper air pressure within the tanks for maintaining a steady fuel flow.
- B- To allow excess fuel to drain overboard when heat expands the volume of fuel within the tanks.
- C- To allow fuel fumes to escape from the tanks, thus eliminating the possibility of the tanks exploding.

3631. Which statement is true regarding fouling of the spark plugs of an aircraft engine?

- A- Spark plug fouling results from operating with an excessively rich mixture.
- B- Carbon fouling of the spark plugs is caused primarily by operating an engine at excessively high cylinder head temperatures.
- C- Excessive heat in the combustion chamber of a cylinder causes oil to form on the center electrode of a spark plug and this fouls the plug.

3632. When refueling aircraft, which precaution would be adequate for eliminating the potential hazard of static electricity?

- A- Ensure that battery and ignition switches are off.
- B- Connect a ground wire from the fuel truck to ground.
- C- Connect a ground wire between the aircraft, fuel truck, fuel nozzle, and ground.

3633. As flight altitude increases, what will occur if no leaning is made with the mixture control?

- A- The volume of air entering the carburetor decreases and the amount of fuel decreases.
- B- The density of air entering the carburetor decreases and the amount of fuel increases.
- C- The density of air entering the carburetor decreases and the amount of fuel remains constant.

3634. When the pilot leans the mixture control, what is being accomplished?

- A- The volume of air entering the carburetor is being reduced.
- B- The volume of air entering the carburetor is being increased.
- C- The amount of fuel entering the combustion chamber is being reduced.

3635. The main purpose of the mixture control is to

- A- increase the air supplied to the engine.
- B- adjust the fuel flow to obtain the proper air/fuel ratio.
- C- decrease the fuel supplied to the engine as the airplane descends.

3636. Proper mixture control and better economy in the operation of a fuel injected engine can be achieved best by use of

- A- a fuel-flow gauge.
- B- an exhaust gas temperature indicator.
- C- the recommended manifold and RPM setting for a particular altitude.

3637. Fuel/air ratio is the ratio between the

- A- volume of fuel and volume of air entering the cylinder.
- B- weight of fuel and weight of air entering the cylinder.
- C- weight of fuel and weight of air entering the carburetor.

3638. Detonation in an aircraft engine is most likely to occur whenever the

- A- fuel/air ratio is such that the mixture burns extremely slow.
- B- engine is operated under conditions which cause the fuel mixture to burn instantaneously.
- C- fuel being used is of a higher grade than recommended by the engine manufacturer.

3639. Detonation occurs at high power settings when the

- A- fuel mixture explodes instead of burning progressively and evenly.
- B- fuel mixture is ignited too early by red-hot carbon deposits in the cylinder.
- C- intake valve opens before the previous charge of fuel has finished burning in the cylinder.

3640. Float-type carburetor systems, compared to fuel injection systems, are generally considered to be

- A- more susceptible to icing than a fuel injection unit.
- B- more susceptible to impact icing than a fuel injection unit.
- C—** less susceptible to icing than a fuel injection unit only when visible moisture is present.

3641. The operating principle of float-type carburetors is based on the

- A- measurement of the fuel flow into the induction system.
- B- difference in air pressure at the venturi throat and the throttle valve.
- C- increase in air velocity in the throat of a venturi causing a decrease in air pressure.

3642. One advantage of fuel injection systems over carburetor systems is

- A- easier hot-engine starting.
- B- better fuel distribution to the cylinders.
- C- less difficulty with hot weather vapor locks during ground operations.

3643. The presence of carburetor ice in an airplane equipped with a fixed-pitch propeller can be verified by applying carburetor heat and noting

- A- a decrease in RPM and then a constant RPM indication.
- B- a decrease in RPM and then a gradual increase in RPM.
- C- an increase in RPM and then a gradual decrease in RPM.

3644. The first indication of carburetor icing in airplanes equipped with constant-speed propellers would most likely be a

- A- decrease in RPM.
- B- decrease in manifold pressure.
- C- rough running engine followed by loss of RPM.

3645. The first indication of carburetor ice in an aircraft with a fixed-pitch propeller is

- A- a decrease in RPM.
- B- a decrease in manifold pressure.
- C- an increase in manifold pressure.

3646. The low temperature that causes carburetor ice in an engine equipped with a float-type carburetor is normally the result of the

- A- compression of air at the carburetor venturi.
- B- freezing temperature of the air entering the carburetor.
- C- vaporization of fuel and expansion of air in the carburetor.

3647. Concerning carburetor icing, which statement is true?

- A- Carburetor icing will form in a carburetor whenever the ambient temperature is below freezing 32 °F (0 °C).
- B- Carburetor icing would most likely form when the air temperature is between 20 °F and 70 °F with visible moisture or high humidity.
- C- The **first** indication of carburetor icing in an airplane equipped with a fixed-pitch propeller is an increase in RPM, followed by a decrease in RPM.

3648. The practice of running a fuel tank dry before switching tanks is considered unwise because

- A- any foreign matter in the tank will be pumped into the fuel system.
- B- the engine-driven fuel pump is lubricated by fuel and operating on a dry tank may cause pump failure.
- C- the engine-driven fuel pump or electric fuel boost pump draw air into the fuel system and cause vapor lock.

3649. Which statement is true regarding propeller efficiency?

- A- Propeller **efficiency** is the ratio of thrust horsepower to brake horsepower.
- B- Propeller efficiency is the actual distance a propeller advances in one revolution.
- C- Propeller **efficiency** is the difference between the geometric pitch of the propeller and its effective pitch.

3650. When operating an aircraft with a constant-speed propeller, which procedure places the least stress on cylinder components?

- A- **When** power settings are being increased, increase manifold pressure before RPM.
- B- When power settings are being decreased, reduce manifold pressure before RPM.
- C- Whether power settings are being increased or decreased, RPM is adjusted before manifold pressure.

3651. During which stroke of a reciprocating engine is the gaseous mixture expanding within the cylinder?

- A- Power stroke.
- B- Intake stroke.
- C- Compression stroke.

3652. To absorb maximum engine power and to develop maximum thrust, a constant-speed propeller should be adjusted to a blade angle which will produce a

- A- large angle of attack and low RPM.
- B- large angle of attack and high RPM.
- C- small angle of attack and high RPM.

3653. Concerning the advantages of an aircraft generator or alternator, select the true statement.

- A- A generator always provides more electrical current than an alternator.
- B- An alternator provides more electrical power at lower engine RPM than a generator.
- C- A generator charges the battery during low engine RPM; therefore, the battery has less chance to become fully discharged, as often occurs with an alternator.

3654. If the ground wire between the magneto and the ignition switch becomes disconnected, the most noticeable result will be that the engine

- A- will run very rough.
- B- cannot be started with the switch in the ON position.
- C- cannot be shut down by turning the switch to the OFF position.

3655. In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the north if

- A- a left turn is entered from a west heading.
- B- an aircraft is decelerated while on an east or west heading.
- C- an aircraft is accelerated while on an east or west heading.

3656. In the Northern Hemisphere, if an aircraft is accelerated or decelerated, the magnetic compass will normally indicate

- A- a turn momentarily, with changes in airspeed on any heading.
- B- a turn toward the south while accelerating on a west heading.
- C- correctly when on a north or south heading while either accelerating or decelerating.

3657. Deviation error of the magnetic compass is caused by

- A- northerly turning error.
- B- certain metals and electrical systems within the aircraft.
- C- the difference in location of true north and magnetic north.

3658. In the Northern Hemisphere, which would be correct about starting the **rollout** from a turn using a magnetic compass?

- A- Start the **rollout** after the compass indication passes south by a number of degrees approximately equal to the latitude minus the normal **rollout** lead.
- B- Start the **rollout** before the compass indication reaches south by a number of degrees approximately equal to the latitude over which the turn is made plus the pilot's normal lead.
- C- Start the **rollout** after the compass indication passes south by a number of degrees approximately equal to the magnetic variation of the area over which the turn is made plus the pilot's normal lead.

3659. What should be the indication on the magnetic compass as you roll into a standard rate turn to the right from a south heading in the Northern Hemisphere?

- A- The compass will initially indicate a turn to the left.
- B- The compass will indicate a turn to the right, but at a faster rate than is actually occurring.
- C- The compass will remain on south for a short time, then gradually catch up to the magnetic heading of the airplane.

3660. Which statement is true about magnetic deviation of a compass?

- A- Deviation is the same for all aircraft in the same locality.
- B- Deviation varies for different headings of the same aircraft.
- C- Deviation is different in a given aircraft in different localities.

3661. Which instrument would be **affected** by excessively low pressure in the airplane's vacuum system?

- A- Heading indicator.
- B- Airspeed indicator.
- C- Pressure altimeter.

3662. Pitot-static system errors are generally the greatest in which range of airspeed?

- A- Low airspeed.
- B- High airspeed.
- C- Maneuvering speed.

3663. During power-off stalls with flaps full down, the stall occurs and the pointer on the airspeed indicator shows a speed less than the minimum limit of the white arc on the indicator. This is most probably due to

- A- a low density altitude.
- B- a malfunction in the **pitot-static** system.
- C- installation error in the pitot-static system.

3664. If a **pitot** tube is clogged, which instrument would be affected?

- A- Altimeter.
- B- Airspeed indicator.
- C- Vertical speed indicator.

3665. If the static pressure tubes are broken inside a pressurized cabin during a high-altitude flight, the altimeter would probably indicate

- A- sea level.
- B- lower than actual flight altitude.
- C- higher than actual flight altitude.

3666. Which statement is true about the effect of temperature changes on the indications of a sensitive altimeter?

- A- Warmer-than-standard temperatures will place the aircraft lower than the altimeter indicates.
- B- Colder-than-standard temperatures will place the aircraft lower than the altimeter indicates.
- C- Colder-than-standard temperatures will place the aircraft higher than the altimeter indicates.

3667. A possible result of using the emergency alternate source of static pressure inside the cabin of an unpressurized airplane is the

- A- airspeed indicator may indicate less than normal.
- B- altimeter may indicate an altitude lower than the actual altitude being flown.
- C- altimeter may indicate an altitude higher than the actual altitude being flown.

3668. Prior to starting the engine, the manifold pressure gauge usually indicates approximately 29" Hg. This is because the

- A- pointer on the gauge is stuck at the full-power indication.
- B- throttle is closed, trapping high air pressure in the manifold.
- C- pressure within the manifold is the same as atmospheric pressure.

3669. What energy source is used to drive the turbines of a turbocharged airplane?

- A- Ignition system.
- B- Engine compressor.
- C- Engine exhaust gases.

3670. What is the primary advantage of a constant-speed propeller?

- A- To maintain a specific engine speed.
- B- To obtain a pitch setting that is suitable for each flight situation and power setting,
- C- To obtain and maintain a selected pitch angle of the blades regardless of the flight situation or power setting.

3671. During climbing flight using a turbocharged airplane, the manifold pressure will remain approximately constant until the

- A- engine's critical altitude is reached.
- B- airplane's service ceiling is reached.
- C- waste gate is fully open and the turbine is operating at minimum speed.

3672. In addition to an added safety factor, dual ignition systems also provide

- A- better combustion.
- B- increased spark plug life.
- C- shorter engine warmup periods.

3673. During the transition from prerotation to flight, all rotor blades change pitch

- A- simultaneously to the same angle of incidence.
- B- simultaneously but to different angles of incidence.
- C- to the same degree at the same point in the cycle of rotation.

3674. Which statement is true concerning rotor systems?

- A- The main rotor blades of a semirigid rotor system can flap and feather as a unit.
- B- The horizontal flapping hinge on a fully articulated rotor system enables the main rotor blades to hunt.
- C- Dampers are normally incorporated in a fully articulated rotor system to prevent excessive motion about the **spanwise** axis of each rotor blade.

3675. The main rotor blades of a fully-articulated rotor system can

- A- flap and feather collectively.
- B- flap, drag, and feather independently.
- C- flap and drag independently, but can feather collectively only.

3676. What is the primary purpose of the freewheeling unit?

- A- It allows the engine to be started without driving the main rotor system.
- B- **It** provides disengagement of the engine from the rotor system for autorotation purposes.
- C- It provides speed reduction between the engine, main rotor system, and tail rotor system.

3677. What is the primary purpose of the clutch?

- A- It allows the engine to be started without driving the main rotor system.
- B- It provides disengagement of the engine from the rotor system for autorotation.
- C- It transmits engine power to the main rotor, tail rotor, generator/alternator, and other accessories.

3678. A high-frequency vibration that suddenly occurs during flight could be an indication of a defective

- A- transmission.
- B- ignition system.
- C- freewheeling unit.

3679. A high-frequency vibration in flight would most likely indicate potential trouble in the

- A- main rotor system.
- B- engine in most helicopters.
- C- tail rotor due to improper rigging.

3680. Helicopter low-frequency vibrations are always associated with the

- A- engine.
- B- main rotor.
- C- transmission.

3681. An electrical system failure (battery and alternator) occurs during flight. In this situation, you would

- A- experience avionics equipment failure.
- B- probably experience failure of the engine ignition system, fuel gauges, aircraft lighting system, and avionics equipment.
- C- probably experience engine failure due to the loss of the engine-driven fuel pump and also experience failure of the radio equipment, lights, and all instruments that require ac current.

3682. The amount of water absorbed in aviation fuels will

- A- remain the same regardless of temperature changes.
- B- increase as the temperature of the fuel increases.
- C—** increase as the temperature of the fuel decreases.

3683. What precautions should be taken with respect to aircraft oxygen systems?

- A- Ensure that only medical oxygen has been used to replenish oxygen containers.
- B- Prohibit smoking while in an aircraft equipped with a portable oxygen system.
- C- Ensure that industrial oxygen has not been used to replenish the system.**

3684. Which statement is true regarding preheating of an aircraft during cold-weather operations?

- A- The cockpit, as well as the engine, should be preheated.
- B- The cockpit area should not be preheated with portable heaters.
- C- Hot air should be blown directly at the engine through the air intakes.**

3685. Crankcase breather lines of an aircraft engine should receive special attention during preflight in cold weather because they are susceptible to being clogged by

- A- ice in the breather lines.
- B- congealed oil from the crankcase.
- C- moisture from the outside air which has frozen.**

3686. If both the ram-air input and drain hole of the **pitot** system are blocked, what airspeed indication can be expected?

- A- Decrease of indicated airspeed during a climb.
- B- Zero indicated airspeed until blockage is removed.
- C- No variation of indicated airspeed in level flight even if large power changes are made.**

3687. The advantage of total energy compensators is that this system

- A- adds the effect of stick thermals to the total energy produced by thermals.
- B- reduces climb and dive errors on variometer indications caused by airspeed changes.
- C- compensates for air pressure changes while climbing or descending.**

3688. Which statement is true concerning total energy compensators?

- A- The instrument responds only to up and down air currents.
- B- The instrument indicates the average rate of climb in a thermal.
- C- The instrument reacts to climbs and descends like a conventional rate-of-climb indicator.**

3689. What is the purpose of the rebreather bag on an oxygen mask in a continuous-flow system?

- A- Helps to conserve oxygen.
- B- Allows excess oxygen to be expelled during use.
- C- Controls amount of oxygen that each individual breathes through the mask.**

3690. (Refer to figure 24.) Which is a fowler flap?

- A- 2.
- B- 3.
- c- 4.**

3691. (Refer to figure **24.**) Which is a slotted flap?

- A- 1.
- B- 3.
- c- 4.**

3692. (Refer to figure 24.) Which is a split flap?

- A- 2.
- B- 3.
- C— 4.**

3693. Which type of flap creates the greatest change in pitching moment?

- A- Plain.
- B- Split.
- C— Fowler.**

3694. **Which** type of flap creates the least change in pitching moment?

- A- Split.
- B- Fowler.
- C- Slotted.

3695. **Which** type of flap is characterized by large increases in lift **coefficient** with minimum changes in drag?

- A- Split.
- B- Fowler.
- C- Slotted.

3696. **What** airspeed indicator marking identifies the maximum structural cruising speed of the airplane?

- A- The red radial line.
- B- The upper limit of the green arc.
- C- The upper limit of the yellow arc.

3697. What does the lower limit of the white arc on an airspeed indicator represent?

- A- Minimum controllable airspeed with flaps extended.
- B- Power-off stall speed in a landing configuration.
- C- Power-off stall speed in a specified configuration.

3698. **What** does the lower limit of the green arc on an airspeed indicator represent?

- A- Power-off stall speed in a landing configuration.
- B- Power-off stall speed in a specified configuration.
- C- Minimum controllable airspeed with gear and flaps retracted.

3699. **Which** airspeed is identified by color coding on an airspeed indicator?

- A- The design maneuvering speed.
- B- The maximum structural cruising speed.
- C- The maximum gear operation or extended speed.

3700. **What** is an important airspeed limitation that is not color coded on airspeed indicators?

- A- Maneuvering speed.
- B- Never-exceed speed.
- C- Maximum flaps-extended speed.

3701. (Refer to figure 25.) Determine the density altitude.

Airport elevation 5,515 ft
OAT **85° F**
Altimeter setting 29.40" Hg

- A- 6,000 feet.
- B- 8,400 feet.
- C- 9,050 feet.

3702. (Refer to figure 25.) Determine the density altitude.

Airport elevation 3,795 ft
OAT **75 °F**
Altimeter setting 29.70" Hg

- A- 6,200 feet.
- B- 5,900 feet.
- C- 3,900 feet.

3763. (Refer to figure 25.) Determine the density altitude.

Airport elevation 3,450 ft
OAT **95 °F**
Altimeter setting 30.40" Hg

- A- 7,200 feet.
- B- 6,650 feet.
- C- 5,950 feet.

3764. Density altitude increases with

- A- an increase in temperature only.
- B- increases in pressure, temperature, and moisture content of the air.
- C—** increases in temperature and moisture content of the air, and a decrease in pressure.

3705. **What** would increase the density altitude at a given airport?

- A- An increase in air temperature.
- B- A decrease in relative humidity.
- C- An increase in atmospheric pressure.

3706. Which statement is true regarding takeoff performance with high density altitude conditions?

- A- The acceleration rate will increase since the lighter air creates less drag.
- B- The acceleration rate is slower because the engine and propeller efficiency is reduced.
- C- A higher-than-normal indicated airspeed is required to produce sufficient lift since the air is less dense.

3707. If the atmospheric pressure and temperature remain the same, how would an increase in humidity affect takeoff performance?

- A- Longer takeoff distance; the air is more dense.
- B- Longer takeoff distance; the air is less dense.
- C- Shorter takeoff distance; the air is more dense.

3708. As altitude increases, the indicated airspeed at which a given airplane stalls in a particular configuration will

- A- remain the same as at low altitude.
- B- decrease as the true airspeed increases.
- C— increase because the air density becomes less.

3709. What effect does an uphill runway slope have upon takeoff performance?

- A- Decreases takeoff speed.
- B- Increases takeoff distance.
- C- Decreases takeoff distance.

3710. (Refer to figure 26.) The gear is down and flaps are set at 15°. If the angle of bank is 20°, what would be the indicated stall speed?

- A- 77 MPH.
- B- 81 MPH.
- C- 89 MPH.

3711. (Refer to figure 26.) If the bank angle is 60° with gear and flaps up, what would be the indicated stall speed?

- A- 110 MPH.
- B- 117 MPH.
- C- 121 MPH.

3712. (Refer to figure 26.) What would be the indicated stall speed during a 40° bank with the gear down and flaps set at 45°?

- A- 81 MPH.
- B- 83 MPH.
- C- 89 MPH.

3713. (Refer to figure 27.) Determine the ground run required for takeoff.

Temperature 71 °F
Pressure altitude 3,500 ft
Weight 2,600 lb
Headwind 25 MPH

- A- 183 feet.
- B- 223 feet.
- C- 311 feet.

3714. (Refer to figure 27.) Determine the ground run required for takeoff.

Temperature 77 °F
Pressure altitude 2,000 ft
Weight. 2,200 lb
Headwind 20 MPH

- A- 106 feet.
- B- 216 feet.
- C- 310 feet.

3715. (Refer to figure 27.) Determine the takeoff distance required to clear a 50-foot obstacle.

Temperature 72 °F
Pressure altitude 3,200 ft
Weight 2,300 lb
Headwind 15 MPH

- A- 606 feet.
- B- 668 feet.
- C- 754 feet.

3716. (Refer to figure 27.) Determine the takeoff distance required to clear a 50-foot obstacle.

Temperature 62 °F
Pressure altitude 6,000 ft
Weight. 2,700 lb
Headwind 15 MPH

- A- 995 feet.
- B- 1,041 feet.
- C- 1,145 feet.

3717. (Refer to figure 28.) The indicated airspeed that would give the greatest gain in altitude in a unit of time at 3,200 feet is determined to be

- A- 93 MPH.
- B- 94 MPH.
- C- 113 MPH.

3718. (Refer to figure 28.) **What** indicated airspeed at 3,000 feet would result in the greatest increase in altitude for a given distance?

- A- 94 MPH.
- B— 113 MPH.**
- C- 115 MPH.

3719. (Refer to figure 28.) To maintain the best rate of climb, the indicated speed should be

- A- maintained at a constant value during the climb.
- B- adjusted to maintain the specified rate of climb.
- C- reduced approximately .8 MPH per 1,000 feet of altitude.

3720. In a propeller-driven airplane, maximum range occurs at

- A- minimum drag required.
- B- minimum power required.
- C- maximum lift/drag ratio.

3721. (Refer to figure 29.) Determine the approximate total distance required to clear a **50-foot** obstacle.

Temperature 20 °C
Pressure altitude 1,000 ft
Surface sod
Weight 5,300 lb
Wind 15 kts headwind

- A- 1,724 feet.
- B— 1,816 feet.**
- C- 2,061 feet.

3722. (Refer to figure 29.) Determine the approximate ground roll required to clear a **50-foot** obstacle.

Temperature 77 °F
Pressure altitude 2,500 ft
Surface asphalt
Weight 5,500 lb
Wind 2 kts **tailwind**

- A- 2,228 feet.
- B- 2,294 feet.
- C- 2,462 feet.

3723. (Refer to figure 29.) Determine the approximate total distance required to clear a **50-foot** obstacle.

Temperature 35 °C
Pressure altitude 3,000 ft
Surface sod
Weight 5,100 lb
Wind 20 kts headwind

- A- 1,969 feet.
- B- 2,023 feet.
- C- 2,289 feet.

3724. (Refer to figure 30.) What is the approximate glide distance?

Height above terrain 5,500 ft
Tailwind 10 kts

- A- 11 miles.
- B- 12 miles.
- C- 13 miles.

3725. (Refer to figure 30.) What is the approximate glide distance?

Height above terrain 10,500 ft
Tailwind 20 kts

- A- 24 miles.
- B- 26 miles.
- C- 28 miles.

3726. (Refer to **figure 30.**) What is the approximate glide distance?

Height above terrain 7,500 **ft**
Headwind 30 kts

- A- 11.5 miles.
- B- 16.5 miles.
- C- 21.5 miles.

3727. (Refer to figure 31.) Determine the approximate crosswind component.

Landing Rwy 30
Wind **020°** at 15 kts

- A- 4 knots.
- B- 15 knots.
- C- 22 knots.

3728. (Refer to figure 31.) Determine the approximate crosswind component.

Landing Rwy 03
Wind **060°** at 35 kts

- A- 12 knots.
- B- 18 knots.
- c- 22 knots.**

3729. (Refer to figure 31.) Determine the approximate crosswind component.

Landing Rwy 22
Wind 260° at 23 kts

- A- 10 knots.
- B- 15 knots.
- c- 17 knots.

3730. (Refer to figure 31.) Using a maximum demonstrated crosswind component equal to 0.2 V_{SO} , what is a pilot able to determine?

V_{SO} 70 kts
Landing Rwy 35
Wind.. **300° at 20 kts**

- A- Headwind component is excessive.
- B- Headwind component exceeds the crosswind component.
- C- Maximum demonstrated crosswind component is exceeded.

3731. (Refer to figure 31.) Using a maximum demonstrated crosswind component equal to 0.2 V_{SO} , what is a pilot able to determine?

V_{SO} 60kts
Landing Rwy 12
Wind **150°** at 20 kts

- A- Headwind component is excessive.
- B- Crosswind component is within safe limits.
- C- Maximum demonstrated crosswind component is exceeded.

3732. (Refer to figure 31.) Using a maximum demonstrated crosswind component equal to 0.2 V_{SO} , what is a pilot able to determine?

V_{SO} 65 kts
Landing Rwy 17
Wind **200° at 30 kts**

- A- Crosswind component is within safe limits.
- B- Crosswind component exceeds the headwind component.
- C- Maximum demonstrated crosswind component is exceeded.

3733. (Refer to figure 32.) What is the total landing distance over a **50-foot** obstacle?

Temperature 50 °**F**
Pressure altitude 4,000 ft
Weight. 3,000 lb
Headwind 22 kts

- A- 1,250 feet.
- B- 1,175 feet.
- C- 1,050 feet.

3734. (Refer to figure 32.) Determine the approximate ground roll.

Temperature **85 °F**
Pressure altitude 6,000 ft
Weight 2,800 lb
Headwind 14 kts

- A- 742 feet.
- B- 1,280 feet.
- C- 1,480 feet.

3735. (Refer to figure 32.) What is the total landing distance over a **50-foot** obstacle?

Temperature 90 °F
Pressure altitude 2,000 ft
Weight 3,400 lb
Headwind 10 kts

- A- 1,650 feet.
- B- 1,575 feet.
- C- 1,475 feet.

3736. (Refer to figure 32.) Determine the approximate ground roll.

Temperature 60 °F
Pressure altitude 8,000 ft
Weight 3,200 lb
Headwind 18 kts

- A- 795 feet.
- B- 1,050 feet.
- C- 1,500 feet.

3737. (Refer to figure 33.) How should the **1,000-pound** weight be shifted to balance the plank on the fulcrum?

- A- 15 inches to the right.
- B- 5 inches to the right.
- C- 5 inches to the left.

3738. (Refer to figure 33.) How should the **500-pound** weight be shifted to balance the plank on the fulcrum?

- A- 10 inches to the left.
- B- 10 inches to the right.
- C- 30 inches to the right.

3739. (Refer to figure 34.) How should the **250-pound** weight be shifted to balance the plank on the fulcrum?

- A- 2 inches to the left.
- B- 2 inches to the right.
- C- 2.5 inches to the left.

3740. (Refer to figure 34.) How should the 200-pound weight be shifted to balance the plank on the fulcrum?

- A- 2.5 inches to the left.
- B- 2 inches to the right.
- C- 2 inches to the **left**.

3741. (Refer to figure 35.) How should the **500-pound** weight be shifted to balance the plank on the fulcrum?

- A- 1 inch to the left.
- B- 1 inch to the right.
- C- 4.5 inches to the right.

3742. (Refer to figure 35.) How should the **250-pound** weight be shifted to balance the plank on the fulcrum?

- A- 8.4 inches to the right.
- B- 2 inches to the right.
- C- 2 inches to the left.

3743. (Refer to figure 36.) If 50 pounds of weight is located at point X and 100 pounds at point Z, how much weight must be located at point Y to balance the plank?

- A- 30 pounds.
- B- 50 pounds.
- C- 300 pounds.

3744. (Refer to figure 36.) If 50 pounds of weight is located at point X and 100 pounds at point Y, how much weight must be located at point Z to balance the plank?

- A- 150 pounds.
- B- 100 pounds.
- C- 50 pounds.

3745. (Refer to figure 36.) If **50-pound** weights are located at points X, Y, and Z, how would point Z have to be shifted to balance the plank?

- A- 25 inches to the left.
- B- 2.5 inches to the left.
- C- 2.5 inches to the right.

3746. Based on this information, the CG would be located how far aft of datum?

Weight A 120 lb at 15" aft of datum
Weight B 200 lb at 117" aft of datum
Weight C 5 lb at 195" aft of datum

- A- 100.8 inches.
- B- 109.0 inches.
- C- 121.7 inches.

3747. Based on this information, where would the CG be located?

Weight D 160 lb at 45" aft of datum
Weight E 170 lb at 145" aft of datum
Weight F 105 lb at 185" aft of datum

- A- 86.0 inches aft of datum.
- B- 117.8 inches aft of datum.
- C- 125.0 inches aft of datum.

3748. Based on this information, the CG would be located how far aft of datum?

Weight X 130 lb at 17" aft of datum
Weight Y 110 lb at 110" aft of datum
Weight Z 75 lb at 210" aft of datum

- A- 89.1 inches.
- B- 95.4 inches.
- C- 106.9 inches.

3749. What is the maximum weight that could be added at Station 130.0 without exceeding the aft CG limit?

Total weight 2,900 lb
CG location Station 115.0
Aft CG limit Station 116.0

- A- 14 pounds.
- B- 140 pounds.
- C- 207 pounds.

3750. What would be the new CG location if 135 pounds of weight were added at Station **109.0**?

Total weight 2,340 lb
CG location Station 103.0

- A- Station 103.3.
- B- Station 104.2.
- C- Station 109.3.

3751. How much weight could be added at Station 160 without exceeding the **aft** CG limit?

Aircraft weight 8,300 lb
CG location Station 90.0
Aft CG limit Station 90.5

- A- 59.7 pounds.
- B—** 16.5 pounds.
- C- 13.9 pounds.

3752. How much weight could be added at Station 120 without exceeding the **aft** CG limit?

Aircraft weight 9,500 lb
CG location Station 90.0
Aft CG limit Station 90.5

- A- 61.0 pounds.
- B- 110.5 pounds.
- C- 161.0 pounds.

3753. What is the maximum weight that could be added at Station 150.0 without exceeding the aft CG limit?

Aircraft weight 5,000 lb
CG location Station 80.0
Aft CG limit Station 80.5

- A- 70.0 pounds.
- B- 69.5 pounds.
- C- 35.9 pounds.

3754. What is the location of the CG if 90 pounds are removed from Station **140**?

Aircraft weight 6,230 lb
CG location Station 79

- A- 79.9.
- B- 78.1.
- c- 77.9.

3755. What is the location of the CG if 146 pounds are removed from Station **150**?

Aircraft weight 7,152 lb
CG location Station 82

- A- 83.4,
- B- 81.3.
- c- 80.6.

3756. What is the location of the CG if 60 pounds are removed from Station **70**?

Aircraft weight 8,420 lb
CG location Station 85

- A- 85.1.
- B- 84.9.
- C- 84.1.

3757. How much weight must be shifted from Station 150.0 to Station 30.0 to move the CG to exactly the aft CG limit?

Total weight 7,500 lb
CG location Station 80.5
Aft CG limit Station 79.5

- A- 68.9 pounds.
- B- 65.8 pounds.
- C- 62.5 pounds.

3758. Could 100 pounds of weight be shifted from Station 130.0 to Station 30.0 without exceeding the forward CG limit?

Total weight 2,800 lb
CG location Station 120.0
Forward CG limit Station 117.0

- A- No; the new CG would be located at Station 116.89.
- B- No; the new CG would be located at Station 116.42.
- C- Yes; the new CG would be located at Station 117.89.

3759. Could 100 pounds of weight be shifted from Station **30.0** to Station 120.0 without exceeding the aft CG limit?

Total weight 4,750 lb
CG location Station 115.8
Aft CG limit Station 118.0

- A- Yes; the CG would remain at Station 115.8.
- B- No; the new CG would be located at Station 118.15.
- C- Yes; the new CG would be located at Station 117.69.

3760. (Refer to figure 37.) Is the airplane loaded within limits?

Empty weight (oil included) **2,260.0** lb
Empty weight moment 93.2 in-lb
Pilot and copilot 400 lb
Center passengers 400 lb
Aft passengers 340 lb
Baggage. 120 lb
Fuel. 89 gal

- A—** Yes; the weight and CG location are acceptable.
- B—** Yes; the weight and CG would be within limits after 254 pounds of fuel were consumed.
- C—** No; the weight exceeds the maximum allowable by 254 pounds, and the CG is aft of the aft limit.

3761. (Refer to figure 37.) Under these conditions, where is the CG located?

Empty weight (oil included) **2,260.0** lb
Empty weight moment 93.2 in-lb
Pilot and copilot 380 lb
Center passengers , 240 lb
Aft passengers 220 lb
Baggage 120 lb
Fuel.. 75 gal

- A- Within the CG envelope.
- B- On the aft limit of the CG envelope.
- C- On the forward limit of the CG envelope.

3762. (Refer to figure 37.) If the airplane were loaded before takeoff as shown below, what would the total weight and moment be after 60.0 gallons of fuel have been used during flight?

Empty weight (oil not included) 2,288.0 lb
Empty weight moment 99.7 in-lb
Oil 8 qt
Oil moment -0.2
Pilot and copilot 330.0 lb
Center passengers 290 lb
Aft passengers 170 lb
Baggage 120 lb
Fuel, 70 gal

- A- Weight 3,618.0 pounds; moment 184.5.
- B- Weight 3,273.0 pounds; moment 168.8.
- C- Weight 3,273.0 pounds; moment 184.5.

3763. (Refer to figure 37.) If the airplane were loaded before takeoff as shown below, what would the total weight and moment be after 70.0 gallons of fuel have been used during flight?

Empty weight (oil included)	2,276.0 lb
Empty weight moment	90.2 in-lb
Pilot and copilot	400 lb
Center passengers	200 lb
Aft passengers	175 lb
Baggage	35 lb
Fuel.	80 gal

- A- 3,131 pounds and 142.7 inch-pounds.
- B- 3,146 pounds and 144.7 inch-pounds.
- C- 3,566 pounds and 162.7 inch-pounds.

3764. (Refer to figure 38.) Determine the condition of the airplane:

Pilot and copilot.	375 lb
Aft passengers	245 lb
Baggage	65 lb
Fuel	70 gal

- A- 185 pounds under allowable gross weight; CG is located within limits.
- B- 162 pounds under allowable gross weight; CG is located within limits.
- C- 162 pounds under allowable gross weight; CG is located aft of the aft limit.

3765. (Refer to figure 38.) What would be the maximum allowable center of gravity in inches aft of datum if the airplane was loaded to 3,400 pounds gross weight?

- A- 82.0 inches.
- B- 84.5 inches.
- C— 85.8 inches.**

3766. (Refer to figure 38.) Determine the condition of the airplane:

Pilot and copilot	400 lb
Aft passengers	240 lb
Baggage	20 lb
Fuel.	75 gal

- A- 157 pounds under allowable gross weight; CG is located within limits.
- B— 180 pounds under allowable gross weight; CG is located within limits.**
- C- 180 pounds under allowable gross weight, but CG is located aft of the aft limit.

3767. (Refer to figure 38.) Determine the condition of the airplane:

Front	
1st person	160 lb
2nd person	156 lb
Rear (aft position)	
1st person	130 lb
2nd person	147 lb
Baggage	50 lb
Fuel.	5gal

- A- 163 pounds under allowable gross weight; CG 82 inches aft of datum.
- B- 197 pounds under allowable gross weight; CG 84.5 inches aft of datum.
- C- 197 pounds under allowable gross weight; CG located outside aft limits.

3768. If the nosewheel of an airplane moves aft during gear retraction, how would this aft movement affect the CG location of that airplane? It would

- A- cause the CG location to move aft.
- B- have no effect on the CG location.
- C- cause the CG location to move forward.

3769. If the landing gear on an airplane moves forward during retraction, the total moments will

- A- increase.
- B- decrease.
- C- remain the same.

3770. The center of gravity of an **aircraft** is computed along the

- A- lateral axis.
- B- vertical axis.
- C- longitudinal axis.

3771. The center of gravity of an aircraft can be determined by

- A- dividing total arms by total moments.
- B- dividing total moments by total weight.
- C— multiplying total arms by total weight.**

3772. In a twin-engine airplane, the single-engine service ceiling is the maximum density altitude at which **V_{YSE}** will produce

- A- 50 feet per minute rate of climb.
- B- 100 feet per minute rate of climb.
- C— 500 feet per minute rate of climb.**

3773. When one engine fails on a twin-engine airplane, the resulting performance loss

- A- may reduce the rate of climb by 80 percent or more.
- B- reduces cruise indicated airspeed by 50 percent or more.
- C- is approximately 50 percent since 50 percent of the normally available thrust is lost.

3774. What is the significance of the blue radial line on the airspeed indicator of a light multiengine airplane and when is it to be used?

- A- It indicates the minimum speed at which the airplane is controllable when the critical engine is suddenly made inoperative and should be used at all altitudes when an engine is inoperative.
- B- It indicates the speed which will provide the maximum altitude gain in a given time when one engine is inoperative and should be used for climb and final approach during engine-out operations.
- C- It indicates the speed which will provide the greatest height for a given distance of forward travel when one engine is inoperative and should be used for all climbs during engine-out operations.

3775. When operating a light multiengine airplane at V_{MC} , the pilot should expect performance to be sufficient to maintain

- A- heading.
- B- heading and altitude.
- C- heading, altitude, and be able to climb at 50 feet per minute.

3776. For an airplane with unsupercharged, reciprocating engines, V_{MC}

- A- decreases with altitude.
- B- increases with altitude.
- C— is not affected by altitude.

3777. Which statement is true regarding the operation of a multiengine airplane with one engine inoperative?

- A- Banking toward the operating engine increases V_{MC} .
- B- Banking toward the inoperative engine increases V_{MC} .
- C- V_{MC} is a designed performance factor which must be proven during type certification and will not change as long as the ball is centered with appropriate rudder pressure.

3778. Which condition causes V_{MC} to be the highest?

- A- CG is at the most forward allowable position.
- B- CG is at the most rearward allowable position.
- C- Gross weight is at the maximum allowable value.

3779. How does increased weight affect the takeoff distance of an airplane?

- A- The airplane will accelerate more slowly with the same power output, but the same airspeed is required to generate necessary lift for takeoff.
- B- The airplane will accelerate more slowly with the same power output, and a higher airspeed is required to generate necessary lift for takeoff.
- C- Every airplane has the same acceleration factor with the same power output, but a higher airspeed is needed to overcome the increased ground effect.

3780. An airplane is loaded with the CG aft of the aft limit. What effect will this have on controllability?

- A- Stall and spin recovery may be difficult or impossible.
- B- A stall will occur at a lower airspeed, but recovery will be easier because of reduced wing loading.
- C- A stall will occur at a higher indicated airspeed due to the greater downloading on the elevator.

3781. The stalling speed of an aircraft will be highest when the aircraft is loaded with a

- A- high gross weight and aft CG.
- B- low gross weight and forward CG.
- C- high gross weight and forward CG.

3782. An airplane is loaded with the CG at the aft limit. What are the performance characteristics compared with the CG at the forward limit?

- ~~A~~— The aft CG provides the highest stall speed and cruising speed.
- B- The aft CG provides the lowest stalling speed, the highest cruising speed, and least stability.
- C- Cruising speed is lower because of more induced drag created by the elevator or stabilizer being required to provide more lift with an aft CG.

3783. If the CG of an airplane is moved from the aft limit to beyond the forward limit, how will it affect the cruising and stalling speed?

- A- Increase both the cruising speed and stalling speed.
- B- Decrease both the cruising speed and stalling speed.
- C- Decrease the cruising speed and increase the stalling speed.

3784. When an aircraft's forward CG limit is exceeded, it will affect the flight characteristics of the aircraft by producing

- A- improved performance since it reduces the induced drag.
- B- higher stalling speeds and more longitudinal stability.
- C- very light elevator control forces which make it easy to inadvertently overstress the aircraft.

3785. As the CG moves aft, an airplane becomes

- A- less stable and less controllable.
- B- less stable, yet easier to control.
- C- more stable and controllable as long as the aft CG is not exceeded.

3786. What is characteristic of the indicated airspeed if the CG is at the most forward allowable position and constant power and altitude are maintained?

- A- There is no relationship between CG location and indicated airspeed.
- B- Indicated airspeed will be less than it would be with the CG in the most rearward allowable position.
- C- Indicated airspeed will be greater than it would be with the CG in the most rearward allowable position.

3787. To maintain level cruising flight in an airplane which is loaded with the CG at the forward limit, an additional download must be imposed on the horizontal stabilizer. This in turn produces

- A- an additional load which the wing must support.
- B- a lesser load that must be supported by the wing.
- C- a decrease in drag and results in a faster airspeed.

3788. Under which condition is a forward CG most critical?

- A- On takeoff.
- B- On landing.
- C- When in an unusual attitude.

3789. As the CG location is changed, recovery from a stall becomes progressively

- A- less difficult as the CG moves rearward.
- B- more difficult as the CG moves rearward.
- C- more difficult as the CG moves either forward or rearward.

3790. If the CG is located **aft** of allowable limits, the pilot may find it impossible to

- A- raise the nose, if necessary, during flight-in gusty wind conditions.
- B- recognize this out-of-balance condition when hovering in strong headwinds.
- ~~C~~— fly in the upper allowable airspeed range due to insufficient forward cyclic control.

3791. While hovering immediately after lift-off, an excessive amount of forward cyclic is required to maintain the desired position over the ground. If flight is continued, this situation will be

- A- aggravated if the fuel tanks are located aft of the CG.
- B- unimproved regardless of the location of the fuel tanks.
- C- aggravated if the fuel tanks are located forward of the CG.

3792. A helicopter is loaded in such a manner that the CG is located aft of the aft allowable CG limit. Which statement is true about this hazardous situation?

- A- In case of an autorotation, sufficient aft cyclic control may not be available to flare properly.
- B- This out-of-balance situation would be easily recognized when hovering in a strong headwind.
- C- Should the helicopter pitch up due to gusty winds during high-speed flight, there may not be sufficient forward cyclic control available to lower the nose.

3793. The most favorable combination of conditions for rotorcraft performance is

- A- low density altitude, low gross weight, and moderate to strong wind.
- B- low density altitude, high gross weight, and calm to light wind.
- C- high density altitude, low gross weight, and moderate to strong wind.

3794. If all other factors remain the same, an increase in relative humidity will

- A- decrease the hovering ceiling because the air is less dense.
- B- increase the hovering ceiling because the air is more dense.
- C- decrease the hovering ceiling because the air is more dense.

3795. An aircraft is flying at a constant power setting and constant indicated altitude. As a result of a decrease in the outside air temperature, the true airspeed will

- A- decrease, and the true altitude will decrease.
- B- increase, and the true altitude will increase.
- C— increase, and the true altitude will decrease.

3796. An aircraft is flying at a constant indicated altitude and a constant power setting. As a result of an increase in the outside air temperature, the true airspeed will

- A- decrease, and the true altitude will decrease.
- B- increase, and the true altitude will increase.
- C- decrease, and the true altitude will increase.

3797. As density altitude increases, which will occur if a constant indicated airspeed is maintained in a no-wind condition?

- A- True airspeed increases; groundspeed decreases.
- B- True airspeed decreases; groundspeed decreases.
- C- True airspeed increases; groundspeed increases.

3798. The best lift/drag ratio of a glider occurs when parasite drag is

- A- equal to total drag.
- B- equal to induced drag.
- C- less than induced drag.

3799. The best lift/drag ratio of a glider is a value that

- A- varies depending upon the weight being carried.
- B- remains constant regardless of airspeed changes.
- C- remains constant and is independent of the weight being carried.

3800. Which is true about the effect on a glider's performance by the addition of ballast or weight?

- A- The glide ratio at a given airspeed will increase.
- B- A higher airspeed is required to obtain the same glide ratio as when lightly loaded.
- C- The heavier the glider is loaded, the less the glide ratio will be at all airspeeds.

3801. Unless otherwise specified, Federal airways extend from

- A- 1,200 feet above the surface upward to 18,000 feet MSL and are 8 NM wide.
- B- 1,200 feet above the surface upward to 14,500 feet MSL and are 16 NM wide.
- C- 700 feet above the surface upward to the Continental Control Area and are 10 NM wide.

3802. GIVEN:

Departure path straight out
Takeoff time 1030 DST
Winds during climb 180" at 30 kts
True course during climb **160°**
Airport elevation 1,500 ft
True airspeed 125 kts
Rate of climb 500 **ft/min**

What would be the distance and time upon reaching 8,500 feet MSL?

- A- 20 NM and 1047 DST.
- B- 23 NM and 1044 DST.
- C- 25 NM and 1047 DST.

3803. GIVEN:

Departure path straight out
Takeoff time 1435Z
Winds during climb **175°** at 25 kts
True course during climb 155"
Airport elevation 2,000 **ft**
True airspeed 130 kts
Rate of climb 500 **ft/min**

What would be the distance and time upon reaching 8,000 feet MSL?

- A- 27 NM and 1455Z.
- B- 24 NM and **1452Z**.
- C- 21 NM and 1447Z.

3804. GIVEN:

Distance 340 SM
True course **260°**
Wind **245°** at 45 kts
True airspeed 135 MPH
Rate of fuel consumption 12.7 **gal/hr**

What would be the approximate groundspeed and amount of fuel consumed?

- A- 74 knots; 50.1 gallons.
- B- 84 MPH; 51.2 gallons.
- C— 90 MPH; 47.3 gallons.**

3805. GIVEN:

Distance 200 SM
True course **320°**
Wind **215°** at 25 kts
True airspeed ., 128 MPH
Rate of fuel consumption 19 **gal/hr**

What would be the approximate groundspeed and amount of fuel consumed?

- A- 132 MPH; 28.9 gallons.
- B- 127 MPH; 33.3 gallons.
- C- 115 knots; 31.5 gallons.

3806. GIVEN:

Usable fuel at takeoff 36 gal
Fuel consumption rate 12.4 **gal/hr**
Constant groundspeed 140 kts
Flight time since takeoff 48 min

According to FAR Part 91, how much farther can an airplane be flown under day VFR?

- A- 294 NM.
- B- 224 NM.
- C- 189 NM.

3807. GIVEN:

Usable fuel at takeoff 36 gal
Fuel consumption rate 12.4 **gal/hr**
Constant groundspeed 140 kts
Flight time since takeoff 48 min

According to FAR Part 91, how much farther can an airplane be flown under night VFR?

- A- 189 NM.
- B- 224 NM.
- C- 294 NM.

3808. GIVEN:

Usable fuel at takeoff 36 gal
Fuel consumption rate 12.4 **gal/hr**
Constant groundspeed 140 kts
Flight time since takeoff 48 min

According to FAR Part 91, how much farther can a **rotorcraft** be flown under VFR?

- A- 294 NM.
- B- 247 NM.
- C- 224 NM.

3809. GIVEN:

Usable fuel at takeoff 40 gal
Fuel consumption rate 12.2 **gal/hr**
Constant groundspeed 120 kts
Flight time since takeoff 1 hr 30 min

According to FAR Part 91, how much farther can an airplane be flown under day VFR?

- A- 176 NM.
- B- 156 NM.
- c- 121 NM.

3810. GIVEN:

Usable fuel at takeoff 40 gal
Fuel consumption rate 12.2 **gal/hr**
Constant groundspeed 120 kts
Flight time since takeoff 1 hr 30 min

According to FAR Part 91, how much farther can an airplane be flown under night VFR?

- A- 216 NM.
- B— 156 NM.**
- C- 121 NM.

3811. GIVEN:

Usable fuel at takeoff 40 gal
Fuel consumption rate 12.2 **gal/hr**
Constant groundspeed 120 kts
Flight time since takeoff 1 hr 30 min

According to FAR Part 91, how much farther can a rotorcraft be flown under day VFR?

- A- 215 NM.
- B- 176 NM.
- c- 121 NM.

3812. If fuel consumption is 15.3 gallons per hour and groundspeed is 167 knots, how much fuel is required for an aircraft to travel 620 NM?

- A- 63 gallons.
- B- 60 gallons.
- C- 57 gallons.

3813. If an aircraft is consuming 91 pounds of fuel per hour and groundspeed is 168 knots, how much fuel is required to travel 457 NM?

- A- 291 pounds.
- B- 265 pounds.
- C- 248 pounds.

3814. If an aircraft is consuming 11.5 gallons of fuel per hour and groundspeed is 155 knots, how much fuel is required to travel 445 NM?

- A- 28 gallons.
- B- 30 gallons.
- C- 33 gallons.

3815. On a cross-country flight, point C is crossed at 0900 hours and the plan is to reach point D at 0925 hours. Use the following information to determine the indicated airspeed required to reach point D on schedule.

Distance between C and D 68 NM
Forecast wind **295°** at 25 kts
Pressure altitude 7,000 ft
Ambient temperature **+10 °C**
True course 175°

The required indicated airspeed would be approximately

- A- 135 knots.
- B- 144 knots.
- c- 166 knots.

3816. On a cross-country flight, point A is crossed at 1500 hours and the plan is to reach point B at 1530 hours. Use the following information to determine the indicated airspeed required to reach point B on schedule.

Distance between A and B 70 NM
Forecast wind **310°** at 15 kts
Pressure altitude 8,000 ft
Ambient temperature -10 °C
True course 270°

The required indicated airspeed would be approximately

- A- 126 knots.
- B- 137 knots.
- C- 152 knots.

3817. On a cross-country flight, point X is crossed at 1015 and arrival at point Y is expected at 1025. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X and Y 27NM
 Forecast wind **240°** at 30 kts
 Pressure altitude 5,500 ft
 Ambient temperature **+05 °C**
 True course 100°

The required indicated airspeed would be approximately

- A- 162 knots.
- B- 140 knots.
- c- 128 knots.

3818. On a cross-country flight, point X is crossed at 1550 and the plan is to reach point Y at 1620. Use the following information to determine the indicated airspeed required to reach point Y on schedule.

Distance between X and Y 70NM
 Forecast wind 115° at 25 kts
 Pressure altitude 9,000 **ft**
 Ambient temperature -05 **°C**
 True course 088°

The required indicated airspeed would be approximately

- A- 138 knots.
- B- 143 knots.
- C- 162 knots.

3819. If the groundspeed is 215 knots, how far will the aircraft travel in 3 minutes' elapsed time?

- A- 3.58 NM.
- B- 6.45 NM.
- c- 10.75 NM.

3820. How far will an aircraft travel in 2-1/2 minutes with a groundspeed of 98 knots?

- A- 2.45 NM.
- B- 3.35 NM.
- C- 4.08 NM.

3821. How far will an aircraft travel in 3-1/2 minutes if its groundspeed is 165 knots?

- A- 5.8 NM.
- B- 9.6 NM.
- C- 12.8 NM.

3822. After 141 miles are flown from the departure point, the aircraft's position is located 11 miles off course. If 71 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- A- 8°.
- B - **11°.**
- c - **14°.**

3823. **After** 150 miles are flown **from** the departure point, the aircraft's position is located 8 miles off course. If 160 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- A- 6°.
- B - **9°.**
- c - **12°.**

3824. **After** 155 miles are flown from the departure point, the aircraft's position is located 10 miles off course. If 80 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- A- 9°.
- B- 11°.
- c - **14°.**

3825. After 240 miles are flown from the departure point, the aircraft's position is located 25 miles off **course**. If 100 miles remain to be flown, what approximate total correction should be made to converge on the destination?

- A - **15°.**
- B - **21°.**
- c- 30°.

3826. A true heading of 125° results in a ground track of **115°**. With a true airspeed of 160 MPH and a groundspeed of 135 MPH, the wind is from

- A- 073° and 36 MPH.
- B- **164°** and 37 MPH.
- C- **175°** and 36 MPH.

3827. If a true heading of 135° results in a ground track of 130° and a true airspeed of 135 knots results in a groundspeed of 140 knots, the wind would be from

- A- 019° and 12 knots.
- B- 200° and 13 knots.
- C- 246° and 13 knots.

3828. If a true heading of 350° results in a ground track of 335° and a true airspeed of 140 knots results in a groundspeed of 115 knots, the wind would be from

- A- 015° and 30 knots.
- B- 035° and 40 knots.
- C- 290° and 40 knots.

3829. If a true heading of 230° results in a ground track of 250° and a true airspeed of 160 knots results in a groundspeed of 175 knots, the wind would be from

- A- 135° and 59 knots.
- B- 165° and 60 knots.
- C- 343° and 60 knots.

3830. Which statement about longitude and latitude is true?

- A- Lines of longitude are parallel to the Equator.
- B- Lines of longitude cross the Equator at right angles.
- C- The 0° line of latitude passes through Greenwich, England.

3831. When planning a distance flight, true course measurements on a Sectional Aeronautical Chart should be made at a meridian near the midpoint of the course because the

- A- values of isogonic lines change from point to point.
- B- angles formed by lines of longitude and the course line vary from point to point.
- C- angles formed by isogonic lines and lines of latitude vary from point to point.

3832. When diverting to an alternate airport because of an emergency, pilots should

- A- rely upon radio as the primary method of navigation.
- B- complete all plotting, measuring, and computations involved before diverting.
- C- apply rule-of-thumb computations, estimates, and other appropriate shortcuts to divert to the new course as soon as possible.

3833. (Refer to figure 39.) The line **from** point A to point B of the wind triangle represents

- A- true heading and airspeed.
- B- true course and groundspeed.
- C- groundspeed and true heading.

3834. (Refer to figure 39.) The line from point B to point C of the wind triangle represents

- A- airspeed and heading.
- B- groundspeed and true course.
- C- true heading and groundspeed.

3835. (Refer to figure 39.) The line from point C to point A of the wind triangle represents

- A- wind direction and velocity.
- B- true course and groundspeed.
- C- true heading and groundspeed.

3836. When converting from true course to magnetic heading, a pilot should

- A- subtract easterly variation and right wind correction angle.
- B- add westerly variation and subtract left wind correction angle.
- C- subtract westerly variation and add right wind correction angle.

3837. When converting from magnetic course to true course, a pilot should

- A- add easterly variation regardless of heading.
- B- add westerly variation regardless of heading.
- C- subtract easterly variation when on a heading of 360°.

3838. When converting from true heading to true course, a pilot should

- A- add right wind correction angle.
- B- add left deviation correction angle.
- C- subtract right wind correction angle.

3839. The angular difference between true north and magnetic north is

- A- magnetic deviation.
- B- magnetic variation.
- C- compass acceleration error.

3840. GIVEN:

True course **258°**
Variation 10° E
Indicated airspeed 142 kts
Ambient temperature **+05 °C**
Pressure altitude 6,500 ft
Forecast wind **350°** at 30 kts

Under these conditions, the magnetic heading and groundspeed would be approximately

- A- 260° and 155 knots.
- B- 270° and 157 knots.
- C- 280° and 155 knots.

3841. GIVEN:

True course 330°
Variation 15° E
Indicated airspeed 160 kts
Ambient temperature -10 °C
Pressure altitude 4,500 ft
Forecast wind 090° at 25 kts

Under these conditions, the magnetic heading and groundspeed would be approximately

- A- **323°** and 177 knots.
- B- 332° and 166 knots.
- C- 340° and 177 knots.

3842. GIVEN:

True course 238°
Variation 3° W
Indicated airspeed 160 kts
Ambient temperature -15 °C
Pressure altitude 8,500 ft
Forecast wind **160°** at 25 kts

Under these conditions, the magnetic heading and groundspeed would be approximately

- A- **224°** and 171 knots.
- B- 233° and 171 knots.
- C- 241° and 178 knots.

3843. (Refer to figure 40.) If a magnetic heading of 050° is maintained and you are receiving ADF indication 5, what will be the relative bearing to the station when you intercept the 180° magnetic bearing to the station?

- A- 130°.
- B— 230°.**
- c- 310°.

3844. (Refer to figure 40.) If a magnetic heading of 170° is maintained and you are receiving ADF indication 1, what will be the relative bearing to the station when you intercept the **090°** magnetic bearing to the station?

- A- 260°.
- B - **270°.**
- G - **280°.**

3845. (Refer to figure 40.) If on a magnetic heading of 030° and receiving ADF indication 5, to what heading should the aircraft be turned to intercept the **150°** bearing from the station at a 30° angle?

- A- 210°.
- B - **180°.**
- c - **120°.**

3846. (Refer to figure 40.) If on a magnetic heading of **270°** and receiving ADF indication 2, to what heading should the **aircraft** be turned to intercept the 350° bearing from the station at a 20° angle?

- A - **190°.**
- B - **290°.**
- c- 330°.

3847. (Refer to figure 40.) If on a magnetic heading of **240°** and receiving ADF indication 2, what would be the magnetic bearing to the station?

- A- 180°.
- B- 240°.
- C- 360°.

3848. (Refer to figure 40.) If on a magnetic heading of **310°** and receiving ADF indication 3, what would be the magnetic bearing to the station?

- A- 085°.
- B - **135°.**
- c - **315°.**

3849. (Refer to figure 40.) If on a magnetic heading of **045°**, which ADF indicator would show a magnetic bearing to the station of **090°**?

- A- 1.
- B- 4.
- C- 5.

3850. (Refer to figure 40.) If on a magnetic heading of **090°**, which ADF indicator would show a magnetic bearing to the station of **180°**?

- A- 2.
- B- 4.
- C- 6.

3851. (Refer to figure 40.) If on a magnetic heading of **120°**, which ADF indicator would show a magnetic bearing to the station of **210°**?

- A- 1.
- B- 3.
- C- 4.

3852. What is the relationship of VHF radio reception and altitude?

- A- VHF reception distance varies in proportion to the altitude of the receiving equipment.
- B- Unlike reception with low or medium frequency (**L/MF**) equipment, VHF reception is not subject to line-of-sight restrictions.
- C- Reception of VHF signals is more subject to signal fades and interference from distant stations than reception of low or medium frequency (**L/MF**) signals.

3853. The normal usable range of an L class VOR below 18,000 feet is

- A- 25 NM.
- B- 40 NM.
- C- 100 NM.

3854. The normal usable range of a T class VOR below 12,000 feet is

- A- 100 NM.
- B- 40 NM.
- C— 25 NM.

3855. The normal usable range of an H class VOR from 18,000 feet to FL450 is

- A- 40 NM.
- B- 100 NM.
- C- 130 NM.

3856. The normal usable range of an H class VOR above FL450 is

- A- 40 NM.
- B- 100 NM.
- C- 130 NM.

3857. (Refer to figure 41.) At which aircraft position(s) would you receive OMNI indication V?

- A- 2 only.
- B- 6 only.
- C- 5 and 8.

3858. (Refer to figure 41.) At which aircraft position(s) would you receive OMNI indication X?

- A- 1 and 3.
- B- 3 and 7.
- C- 7 only.

3859. (Refer to figure 41.) At which aircraft position(s) would you receive OMNI indication U?

- A- 1 and 2.
- B- 2 only.
- C- 6 only.

3860. (Refer to figure 41.) Which OMNI indication would you receive for aircraft **8**?

- A- T.
- B- V.
- C- W.

3861. (Refer to figure 41.) Which OMNI indications would you receive for aircraft **5** and **7**?

- A- T and X.
- B— V and X.
- C- W and Z.

3862. (Refer to figure 42.) Which RMI indicator shows your position to be northwest of the station?

- A- 2.
- B- 3.
- C- 6.

3863. (Refer to figure 42.) Which RMI indicator shows you crossing the **115°** radial?

- A- 2.
- B- 5.
- c - **8.**

3864. (Refer to figure 42.) RMI indicator 2 shows the magnetic bearing to the station to be

- A - **295°.**
- B - **125°.**
- c - **115°.**

3865. (Refer to figure 42.) Which RMI indicator shows you outbound on the 315° radial?

- A- 1.
- B— 4.**
- C— 9.**

3866. In reference to low frequency radio wave propagation, the distance between the transmitting antenna and the point where the sky wave first returns to the ground is called the

- A- skip zone.
- B— ground wave.**
- C- skip distance.

3867. The very high frequency radio band is from

- A - 30 to 300 **kHz.**
- B - 30 to 300 MHz.
- C - 300 to 3000 **kHz.**

3868. Which distance is commonly displayed by a DME indicator?

- A- Slant-range distance in statute miles.
- B- Slant-range distance in nautical miles.
- C- The distance from the aircraft to a point at the same altitude directly above the VORTAC.

3869. Which DME indication should you receive when you are directly over a VORTAC site at approximately 6,000 feet AGL?

- A- 0.
- B- 1.
- c- **1.3.**

3870. The slant-range error of a DME is greatest at

- A- low altitude directly over the facility.
- B- high altitude directly over the facility.
- C- high altitude and high range from the facility.

3871. In an RNAV mode, the lateral deflection of the **CDI** indicates

- A- degrees left or right of course.
- B- statute miles left or right of course.
- C- nautical miles left or right of course.

3872. If you are 30 miles from the NDB transmitter and the ADF indicates 3° off course, how many miles off course are you?

- A- **1.5.**
- B- 3.
- C- 6.

3873. Which statement is true regarding tracking a desired bearing when using ADF during crosswind conditions?

- A- To track outbound, heading corrections should be made away from the ADF pointer.
- B- When on the desired track inbound with the proper **drift** correction established, the ADF pointer will be deflected to the windward side of the nose position.
- C- When on the desired track outbound with the proper drift correction established, the ADF pointer will be deflected to the windward side of the tail position.

3874. The ADF is tuned to a nondirectional radio beacon and the relative bearing changes from **090°** to **100°** in 1.5 minutes' elapsed time. The time en route to the station would be

- A- 6 minutes.
- B- 9 minutes.
- C- **15 minutes.**

3875. The ADF indicates a 5° wingtip bearing change in 2.5 minutes' elapsed time. If the true airspeed is 125 knots, the distance to the station would be

- A- 31.2 NM.
- B- 56.5 NM.
- C- **62.5 NM.**

3876. While maintaining a magnetic heading of 060° and a true airspeed of 130 knots, the 150° radial of a VOR is crossed at 1137 and the 140° radial at 1145. The approximate time and distance to the station would be

- A - 38 minutes and 82 NM.
- B - 42 minutes and 91 NM.
- C - 48 minutes and 104 NM.

3877. While maintaining a magnetic heading of 180° and a true airspeed of 130 knots, the 270° radial of a VOR is crossed at 1037 and the 260° radial at 1042. The approximate time and distance to the station would be

- A - 30 minutes and 65 NM.
- B - 42 minutes and 104 NM.
- C - 44 minutes and 96 NM.

3878. **NDB's** normally operate in the frequency range of

- A - 190 to 535 **kHz**.
- B - 400 to 1020 Hz.
- C - 962 to 1213 MHz.

3879. When using a VOT to check the accuracy of a VOR receiver with an RMI, what should the RMI indicate if no error exists?

- A- 180° FROM.
- B - **180° TO**.
- C - **360° TO**.

3880. When using a VOT to check the accuracy of a VOR receiver, with the **CDI** centered, what should the OBS indicate if no error exists?

- A- 360° TO, 270° FROM.
- B- 180° FROM, **360° TO**.
- C- 180° TO, **360° FROM**.

3881. A particular VORTAC station is undergoing routine maintenance. This is evidenced by

- A- removal of the identification feature.
- B- removal of the voice feature of the TACAN.
- C- transmitting a series of dashes **after** each identification signal.

3882. The three individual navigation services provided by a VORTAC facility are

- A- UHF VOR azimuth, VHF TACAN azimuth, and VHF TACAN distance information.
- B- VHF VOR azimuth, UHF TACAN azimuth, and UHF TACAN distance information.
- C- VHF VOR azimuth, VHF TACAN azimuth, and UHF TACAN distance information.

3883. Which statement is true concerning the operation of DME?

- A- DME operates in the VHF frequency band.
- B- Distance information received from DME is the actual horizontal distance from the station.
- C- DME coded identification is transmitted once for each three or four times that the VOR coded identification is transmitted.

3884. Up to 199 NM at line-of-sight altitudes, the accuracy of DME systems is better than

- A- 1 mile or 6 percent of the distance, whichever is less.
- B- 1 mile or 3 percent of the distance, whichever is greater.
- C- one-half mile or 3 percent of the distance, whichever is greater.

3885. **When** designated in conjunction with an airport which has a published instrument approach procedure, what airspace is defined as a transition area?

- A- The airspace extending upward from the surface to 3,000 feet within a 5 SM radius from the center of an airport.
- B- That airspace extending upward from 700 feet or more AGL and terminating at the base of the overlying controlled airspace.
- C- That airspace extending upward from the surface and terminating at the base of the overlying Continental Control Area.

3886. Within the conterminous United States, the floor of the positive control area is

- A- 14,500 feet MSL.
- B- 18,000 feet MSL.
- C- **24,000** feet MSL.

3887. With certain exceptions, the Continental Control Area extends upward from

- A- 10,000 feet MSL.
- B— 14,500 feet MSL.**
- C- 18,000 feet MSL.

3888. Transition areas within the contiguous United States extend upward from either 700 feet or 1,200 feet above the surface to, but not including,

- A- 3,000 feet MSL.
- B— 18,000 feet MSL.**
- C- the base of the overlying controlled airspace.

3889. Within the contiguous United States, the vertical limit of control zones extends from the surface upward to

- A- but not including, 3,000 feet AGL.
- B- but not including, 10,000 feet MSL.
- C- the base of the Continental Control Area.

3890. One of the major differences between control zones and transition areas is that all control zones

- A- are located around tower-controlled airports only.
- B- always begin at 700 feet AGL while transition areas always begin at 1,200 feet above the surface.
- C- begin at the surface, while all transition areas begin at an altitude of 700 feet or higher above the surface.

3891. (Refer to figure 43.) The minimum avionics equipment necessary to operate in the airspace below 6,000 feet MSL and above 1,000 feet AGL over Washington National Airport (area A) is

- A- transponder, encoding altimeter, and VOR.
- B- two-way radio communications, transponder, and VOR.
- C- two-way radio communications, transponder, and encoding altimeter.

3892. (Refer to figure 43.) The airspace overlying Davison Army Airfield (area C) is

- A- uncontrolled from the surface to 700 feet AGL.
- B— a control zone from the surface to 14,500 feet MSL.**
- C- an airport **traffic** area from the surface to 3,000 feet MSL.

3893. (Refer to figure 43.) What minimum radio equipment is required for operation into Dulles International Airport (area B)?

- A- Two-way radio communications.
- B- Two-way radio communications, transponder, and encoding altimeter.
- C- Two-way radio communications, transponder, and VOR.

3894. (Refer to figure 43.) The top of the ARSA at Baltimore-Washington International Airport (area D) is

- A- 3,146 feet AGL.
- B- 4,200 feet MSL.
- C— 4,200 feet AGL.**

3895. (Refer to figure 43.) The base of the outer circle of the ARSA at Dulles International Airport (area B) is

- A- 700 feet AGL.
- B- 1,200 feet AGL.
- C- 1,700 feet MSL.

3896. (Refer to figure 43.) The airspace overlying Baltimore-Washington International Airport (area D) from the surface to 4,200 feet MSL is

- A - **a TCA.**
- B— an ARSA.**
- C- an airport **traffic** area.

3897. (Refer to figure 43.) At what altitude does the TCA begin over Bower Airport (area E)?

- A- Surface.
- B- 1,500 feet MSL.
- C- 2,500 feet AGL.

3898. (Refer to figure 43.) When, if ever, are two-way radio communications required on a flight from Godfrey Field (area F) to Freeway Airport (area G) at an altitude of 1,000 feet AGL?

- A- None required.
- B- When in the TCA and the Dulles ARSA.
- C- When flying through the Dulles control zone.

3899. (Refer to figure 43.) What is the floor of the ARSA over **Tipton** Army Airfield (area H)?

- A- 1,300 feet AGL.
- B- 1,700 feet MSL.
- C- 2,500 feet MSL.

3900. (Refer to figure 44.) When are two-way radio communications required during a flight from Zuehl Airport (area **E**) to Castroville Airport (area **C**) at 4,500 feet MSL?

- A- When entering the San Antonio Airport Radar Service Area.
- B- When entering the Kelly, Stinson, and Randolph airport traffic areas, as well as entering the San Antonio Airport Radar Service Area.
- C- When entering the Kelly and Stinson airport traffic areas, the San Antonio Airport Radar Service Area, and Randolph AFB restricted area.

3901. (Refer to figure 44.) Where does the floor of controlled airspace begin over Boening Airport (area **G**)?

- A- 700 feet AGL.
- B- 1,200 feet MSL.
- C- 1,200 feet AGL.

3902. (Refer to figure 44.) Where does the floor of controlled airspace begin over Devine Airport (area **B**)?

- A- Surface.
- B- 700 feet MSL.
- C- 1,402 feet MSL.

3903. (Refer to figure 44.) What is the ceiling of the San Antonio Airport Radar Service Area (area **D**)?

- A- 3,000 feet MSL.
- B- 4,800 feet MSL.
- C- 4,800 feet AGL.

3904. (Refer to figure 44.) The airspace over Kelly AFB Airport (area **F**) which begins at the surface and terminates at 14,500 feet is

- A- a control zone.
- B- a military operations area.
- C- an airport radar service area.

3905. (Refer to figure 44.) As it relates to operations in the airport radar service area, which statement is correct when departing Twin Oaks Airport (area **D**)?

- A- An altitude below 2,000 feet MSL must be maintained until clear of the area.
- B- Prior permission from approach control must be obtained before takeoff.
- C- Two-way radio communication with air traffic control must be established as soon as possible after departure.

3906. (Refer to figure 44.) What are the requirements for operating in the alert area surrounding Randolph AFB (area **H**)?

- A- Prior permission must be obtained **from** the controlling agency.
- B- Contact with approach control on frequency 118.9 is required.
- C- There are no requirements, but pilots should be extremely cautious due to extensive student training.

3997. (Refer to figure 44.) On what **frequency** is Automatic Terminal Information Service transmitted at San Antonio International Airport (area **D**)?

- A- 118.9.
- B- 119.8.
- C- 122.95.

3908. (Refer to figure 44.) Select the correct statement concerning the obstruction 17 SM north of Pleasanton Airport (area **A**).

- A- The obstruction is unlighted.
- B- The obstruction has high-intensity lights.
- C- The elevation of the top of the obstruction is 1,639 feet AGL.

3909. (Refer to figure 44.) What is the elevation of the top of the double obstruction 4 SM southwest of Pleasanton Airport (area **A**)?

- A- 320 feet AGL.
- B- 460 feet MSL.
- C- 780 feet MSL.

3910. (Refer to figure 45.) What altitude should be selected to avoid operating in the terminal control area on a flight which departs Saginaw Airport (area A) and lands at Northwest Regional Airport (area B)?

- A- 3,500 feet MSL.
- B- 3,000 feet MSL.
- C- 2,500 feet MSL.

3911. (Refer to figure 45.) What is the ceiling of the airport radar service area over Addison Airport (area D)?

- A- 4,500 feet MSL.
- B- 5,000 feet MSL.
- C- 8,000 feet MSL.

3912. (Refer to figure 45.) When, if ever, are two-way radio communications required if en route from Lancaster Airport (area C) direct to Dallas North Airport (area E) at 3,000 feet MSL?

- A- When entering the terminal control area.
- B- When entering the airport radar service area.
- C—** When transitioning through Dallas Love and Addison airport **traffic** areas.

3913. (Refer to figure 45.) Where does the floor of controlled airspace begin over Dallas North Airport (area E)?

- A- 700 feet AGL.
- B- 1,200 feet AGL.
- C- 5,000 feet MSL.

3914. (Refer to figure 45.) The airspace beginning at 3,000 feet MSL over Addison Airport (area D) is

- A- a control zone.
- B- a terminal control area.
- C- an airport radar service area.

3915. (Refer to figure 45.) What does the figure **1⁷** (area F) indicate?

- A- Minimum safe altitude for that quadrangle.
- B- Maximum elevation figure for that quadrangle.
- C- Height above ground of the tallest obstruction for that quadrangle.

3916. (Refer to figure 45.) What is the length of the longest runway at Addison Airport (area D)?

- A- 6,400 feet.
- B- 7,200 feet.
- C- 8,800 feet.

3917. (Refer to figure 45.) Select the correct statement concerning the Dallas-Fort Worth VORTAC (area G).

- A- The VORTAC frequency is 114.3.
- B- The VORTAC frequency has no voice capability.
- C- A pilot may receive transmissions from Dallas FSS over the VORTAC frequency.

3918. (Refer to figure 45.) What is the elevation of Lancaster Airport (area C)?

- A- 50 feet MSL.
- B- 500 feet MSL.
- C- 988 feet MSL.

3919. (Refer to figure 46.) What is the normal radius of the outer area (area B)?

- A- 10 NM.
- B- 20 NM.
- C- 25 NM.

3920. (Refer to figure 46.) What is the radius of the inner circle (circle C)?

- A- 5 miles.
- B- 10 miles.
- C- 15 miles.

3921. (Refer to figure 46.) What is the radius of the outer circle (circle A)?

- A- 5 miles.
- B- 10 miles.
- C- 15 miles.

3922. (Refer to figure 46.) Which altitude (box 2) is applicable to the base of the outer circle?

- A- 700 feet AGL.
- B- 1,000 feet AGL.
- C- 1,200 feet AGL.

3923. (Refer to figure 46.) Which altitude (box 1) is applicable to the vertical extent of the inner and outer circles?

- A- 3,000 feet AGL.
- B- 3,000 feet above airport.
- C- 4,000 feet above airport.

3924. What minimum aircraft equipment is required for operation within an ARSA?

- A- Two-way communications.
- B- Two-way communications and transponder with automatic altitude reporting capability.
- C- Two-way communications, transponder with automatic altitude reporting capability, and VOR.

3925. To operate an aircraft from a satellite airport within an ARSA, the pilot must

- A- monitor ATC until clear of the ARSA.
- B- contact ATC as soon as practicable after takeoff.
- C- secure prior approval from ATC before takeoff at the airport.

3926. All operations within an ARSA must be

- A- in compliance with ATC clearances and instructions.
- B- on a flight plan filed prior to arrival or departure.
- C- in an aircraft equipped with a 4096 transponder with automatic altitude reporting capability.

3927. Flight through a restricted area should not be accomplished unless the pilot has

- A- filed a VFR flight plan.
- B- received prior authorization from the controlling agency.
- C- received prior permission from the commanding officer of the nearest military base.

3928. What hazards to aircraft may exist in warning areas and where are the warning areas located?

- A- Student training areas or parachute jumping areas in or near heavily populated areas.
- B- Unusual, **often** invisible, hazards such as artillery firing or missiles over military reservations.
- C- Unusual, often invisible, hazards such as aerial gunnery or guided missiles over international waters.

3929. Where are warning areas established?

- A- In mountainous areas.
- B- Beyond the nation's S-mile limit.
- C- In the vicinity of military bases.

3930. Airspace established as warning areas are located

- A- in international airspace.
- B- in the immediate vicinity of military bases.
- C- along military low-altitude training routes.

3931. A military operations area (**MOA**) is airspace of defined vertical and lateral limits established for the purpose of

- A- separating certain military training activities from IFR **traffic**.
- B- military services conducting VFR low altitude navigation, tactical training, and flight testing.
- C—** denoting the existence of unusual hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles.

3932. When operating VFR in a military operations area (**MOA**), a pilot

- A- must operate only when military activity is not being conducted.
- B- should exercise extreme caution when military activity is being conducted.
- C- must obtain a clearance from the controlling agency prior to entering the MOA.

3933. The purpose of designating certain airspace as a transition area is to

- A- extend the lateral limits of a control zone.
- B- enable ATC to control all flights within a given area.
- C- ensure that IFR flights can remain within controlled airspace for terminal operations.

3934. Airport traffic areas normally extend from the surface up to, but not including,

- A- 3,000 feet above the airport and have a radius of 5 SM.
- B- 3,000 feet above the surface surrounding the airport and have the same horizontal limits of the associated control zone.
- C- the upper limit of the associated control zones and have a radius of 5 SM with extensions as necessary for instrument approaches,

3935. An airport traffic area extends upward to, but does not include,

- A- 2,000 feet AGL.
- B- 3,000 feet MSL.
- C- 3,000 feet AGL.

3936. Airport **traffic** areas are in effect at all airports where

- A- an FSS is in operation.
- B- a control tower is in operation.
- C- the airport is located within the lateral limits of controlled airspace.

3937. Airport advisory areas exist only at airports with

- A- operating **FSS's**.
- B- operating control towers.
- C- Automatic Terminal Information Service.

3938. What is an airport advisory area?

- A- That airspace within 10 SM of an airport which does not have a control tower but where an FSS is located.
- B- That airspace within 5 SM of an airport extending up to, but does not include 3,000 feet, within which a control tower is in operation.
- C- That airspace identified by an area on the surface within which flight of an aircraft is subject to special restrictions.

3939. If a military training route will have flights operating at or below 1,500 feet AGL, it will be designated by

- A- VR and a three digit number only.
- B- IR or VR and a four digit number.
- C- IR or VR and a three digit number.

3940. IFR military training routes are usually flown from

- A- above 1,500 feet AGL to 10,000 feet MSL.
- B- above 1,500 feet AGL to 18,000 feet MSL.
- C- at or above 1,500 feet AGL to 5,000 feet AGL.

3941. Which chart depicts IFR and VFR military training routes regardless of altitude?

- A- IFR Planning Chart.
- B- Sectional Aeronautical Chart.
- C- IFR Low Altitude En Route Chart.

3942. Radar service available under the terminal radar program for VFR aircraft provides,

- A- separation between all VFR and IFR aircraft within the **TRSA**.
- B- **traffic** information and positive control of all aircraft within the TCA.
- C- **traffic** information and limited vectoring to VFR aircraft on a workload permitting basis.

3943. Stage III Service within a TRSA utilizes radar to provide

- A- separation between all VFR aircraft operating within the TRSA
- B—** radar vectoring if the weather minimums are below VFR conditions.
- C- separation between all participating VFR aircraft and IFR aircraft operating within the TRSA.

3944. How is a control zone depicted on Sectional Aeronautical Charts?

- A- A blue airport symbol.
- B- A blue dashed line encircling the airport.
- C- A magenta colored band surrounding the airport.

3945. Sectional charts for the conterminous United States are updated each

- A- 3 months.
- B- 6 months.
- C- 12 months.

3946. Why should the integrated method of flight instruction be used during student training?

- A- Prevents the formation of **firm** habit patterns.
- B- Encourages students to concentrate on flying by reference to instruments.
- C- Develops proper habit patterns of instrument interpretation and aircraft control.

3947. To help prevent overturning when taxiing light tricycle-gear airplanes (especially high-wing type) in strong quartering tailwinds, the

- A- elevator should be placed in the up position.
- B- elevator should be placed in the down position.
- C- aileron on the downwind side should be placed in the down position.

3948. Which aileron position should you generally use when taxiing in strong quartering headwinds?

- A- Neutral.
- B- Aileron up on the side from which the wind is blowing.
- C- Aileron down on the side from which the wind is blowing.

3949. When taxiing with strong quartering tailwinds, which aileron position should be used?

- A- Neutral.
- B- Aileron up on the side from which the wind is blowing.
- C- Aileron down on the side from which the wind is blowing.

3950. Why should an airplane be headed into the wind for the pretakeoff check?

- A- To prevent the need for more brake pressure to keep the airplane from moving forward.
- B- To prevent excessive load factors which could occur during run-up if a crosswind condition exists.
- C- To obtain more accurate operating indications and to minimize engine overheating when the engine is run up.

3951. Select the four flight fundamentals involved in maneuvering an aircraft.

- A- Aircraft power, pitch, bank, and trim.
- B- Starting, taxiing, takeoff, and landing.
- C- Straight-and-level flight, turns, climbs, and descents.

3962. During level turns in side-by-side airplanes, which is characteristic of student performance?

- A- Diving during right turns because the nose appears to rise during entry into these turns.
- B- Diving during left turns because the nose appears to rise during entry into these turns.
- C- Climbing during left turns because the nose appears to descend during entry into these turns.

3953. During the entry to a right turn, the nose of the aircraft swings slightly to the left before it swings along the horizon to the right. This is a

- A- slipping entry, caused by excessive right rudder pressure.
- B- skidding entry; more right rudder pressure and less right aileron pressure should have been applied.
- C- slipping entry; more right rudder pressure should have been applied for the amount of aileron pressure being used.

3954. What will cause the nose of an aircraft to move in the direction of the turn before the bank starts in a turn entry?

- A- Rudder being applied too late.
- B- Rudder being applied too soon.
- C- Failure to apply back elevator pressure.

3955. How should a student be taught to correct for a nose-low attitude during a steep turn?

- A- Apply back elevator pressure to attain the desired pitch attitude.
- B- Reduce the angle of bank, then apply back elevator pressure to attain the desired pitch attitude.
- C- Apply back elevator pressure to attain the desired pitch attitude, then reduce the angle of bank.

3966. While holding a constant angle of bank in a coordinated turn, the displacement of the turn needle will

- A- increase as airspeed decreases.
- B- increase as airspeed increases.
- C- remain constant regardless of airspeed.

3957. What effect, during a constant 30° banked turn, would a reduction in airspeed have on (a) the rate of turn, and (b) the radius of turn?

- A- The rate of turn would increase; the radius of turn would decrease.
- B- The rate of turn would decrease; the radius of turn would increase.
- C- The rate of turn would decrease; the radius of turn would decrease.

3958. During a level turn, increasing the airspeed while maintaining a constant load factor would result in

- A- a decrease in radius of turn.
- B- an increase in radius of turn.
- C- an increase in centrifugal force.

3959. Which is the best technique for minimizing the wing-load factor when flying in severe turbulence?

- A- Control airspeed with power, maintain wings level, and accept variations of altitude.
- B- Control airspeed as closely as possible with elevator and power, and accept variations of bank and altitude.
- C- Set power and trim to obtain an airspeed at or below maneuvering speed, maintain wings level, and accept variations of airspeed and altitude.

3960. When explaining the techniques used for making short- and soft-field takeoffs, it would be correct to state that

- A- during soft-field takeoffs, lift-off should be made as soon as possible.
- B- during soft-field takeoffs, lift-off should be made only when best angle-of-climb speed is attained.
- C- during short-field takeoffs, lift-off should be attempted only after best rate-of-climb speed is attained.

3961. The indicated lift-off airspeed for short-field takeoffs in a particular airplane will normally be

- A- the same as for soft- or rough-field takeoffs.
- B- greater than for soft- or rough-field takeoffs.
- C- greater under **tailwind** conditions than that required under headwind conditions.

3962. To minimize the side loads placed on the landing gear during touchdown, the pilot should keep the

- A- direction of motion of the airplane parallel to the runway.
- B- longitudinal axis of the airplane parallel to the direction of its motion.
- C- downwind wing lowered sufficiently to eliminate the tendency for the airplane to drift.

3963. Under normal conditions, a proper crosswind landing on a runway requires that, at the moment of touchdown, the

- A- direction of motion of the airplane and its longitudinal axis be parallel to the runway.
- B- downwind wing be lowered sufficiently to eliminate the tendency for the airplane to drift.
- C- direction of motion of the airplane and its lateral axis be perpendicular to the runway.

3964. During a power approach to a short-field landing, the correct airspeed may be verified by

- A- the ability to land on a predetermined spot.
- B- little or no floating during the landing flare.
- C- the ability to maintain a constant angle of descent.

3965. If an emergency situation requires a downwind landing, pilots should expect a faster

- A- airspeed at touchdown, a longer ground roll, and better control throughout the landing roll.
- B- groundspeed at touchdown, a longer ground roll, and the likelihood of overshooting the desired touchdown point.
- C- groundspeed at touchdown, a shorter ground roll, and the likelihood of undershooting the desired touchdown point.

3966. On **final** approach to landing, a faster-than-normal indicated airspeed should be used when

- A- turbulent conditions exist.
- B- ambient temperatures are above 90 °F.
- C- landing at airports above 5,000 feet MSL with above standard temperature conditions.

3967. If poor aircraft controllability is experienced during an emergency go-around with full flaps, the cause is most probably due to

- A- excessive airspeed with full flaps extended.
- B- the high-power, low-air-speed situation with the airplane trimmed for a full-flap configuration.
- C- a reduction in the angle of attack with full flaps to the point where the aircraft control is greatly impaired.

3968. A go-around from a poor landing approach should

- A- not be attempted unless circumstances make it absolutely necessary.
- B- generally be preferable to last minute attempts to prevent a bad landing.
- C- not be attempted after the landing flare has been initiated regardless of airspeed.

3969. During go-arounds from a full-flap approach in conventional airplanes, which procedure should be used if the flight manual does not specify differently?

- A- Start retracting the flaps first, then retract the gear.
- B- Retract the gear first and adjust flaps only after reaching a safe altitude.
- C— Retract the gear first since it has a far greater adverse effect on aircraft performance than do flaps.

3970. One reason a student tends to round out high during landing is

- A- changing focus gradually.
- B- focusing on references too far ahead.
- C- focusing on references that are too close or looking directly down.

3971. What could be a result of a student focusing too far ahead during a landing approach?

- A- Reactions will be either too abrupt or too late.
- B- Rounding out too high and developing an excessive sink rate.
- C- Difficulty in judging the closeness of the ground resulting in a nose-first touchdown.

3972. Immediately after takeoff, a downwind turn close to the ground is not good practice because it

- A- decreases the rate of climb significantly.
- B- causes an increase in the speed at which rotor stall occurs.
- C- increases the hazards involved should an emergency landing become necessary.

3973. On a power-off final approach, a pilot establishes a glide attitude which is too flat. The proper recovery procedure for the subsequent high rate of descent is to

- A- increase rotor lift by applying aft cyclic pressure.
- B- increase power, and if altitude permits, lower the nose.
- C- lower the nose immediately, but do not increase the power since this will again raise the nose.

3974. What normally results from excessive airspeed on final approach?

- A- Bouncing.
- B- Floating.
- C- Ballooning.

3975. What normally results from misjudging the rate of sink during a landing?

- A- Floating.
- B- Ballooning.
- C- Poor directional control.

3976. What procedure should be used to correct for slight ballooning during landing?

- A- Decrease power.
- B- Decrease angle of attack.
- C- Hold a constant landing attitude.

3977. To properly compensate for a crosswind during straight-and-level cruising flight, the pilot should

- A- hold rudder pressure toward the wind.
- B- establish a proper heading into the wind by coordinated use of the controls.
- C- hold aileron pressure toward the wind and hold opposite rudder pressure to prevent a turn.

3978. When beginning a rectangular course, the determining factor in deciding the distance from the field boundary at which an aircraft should be flown is the

- A- windspeed.
- B- size of the rectangular area chosen.
- C- steepness of the bank desired in the turns.

3979. (Refer to figure 47.) In flying the rectangular course, when would the aircraft be turned less than 90°?

- A - Corners 1 and 4.
- B - Corners 1 and 2.
- C - Corners 2 and 4.

3980. (Refer to figure 47.) In flying the rectangular course, when would the aircraft be turned more than 90°?

- A - Corners 2 and 3.
- B - Corners 1 and 3.
- C - Corners 2 and 4.

3981. (Refer to figure 47.) In flying the rectangular course, when should the aircraft bank vary from a steep bank to a medium bank?

- A- Corner 1.
- B- Corner 3.
- C- Corners 2 and 3.

3982. (Refer to figure 47.) In flying the rectangular course, which would describe the proper angle of bank?

- A- Corner 1 shallow, corner 2 medium, corner 3 steep, and corner 4 shallow.
- B- Corner 1 shallow, corner 2 medium to steep, corner 3 steep, and corner 4 medium to shallow.
- C- Corner 1 shallow to medium, corner 2 medium to steep, corner 3 steep to medium, and corner 4 medium to shallow.

3983. (See figure 48.) At which points will the wing (lateral axis) be in alignment with the pylon during turns around a point?

- A - 1 and 3.
- B - 2 and 4.
- C - 1, 2, 3, and 4.

3984. (Refer to figure 48.) If you instruct a student to practice turns around a point using a bank that is not to exceed 45° at its steepest point, it would be best to start at which of the positions shown?

- A- 1 or 4.
- B- 1 or 3.
- C- 4 only.

3986. During turns around a point, an imaginary line from the pilot's eye and parallel to the lateral axis should point to the pylon when the airplane is abeam the point headed directly

- A- crosswind.
- B- downwind only.
- C- upwind or downwind.

3986. (Refer to figure 49.) The groundspeed will be equal in which positions?

- A - 1 and 5 only.
- B - 1 and 5, 2 and 4, 6 and 8.
- C - 1 and 5, 2 and 8, 4 and 6.

3987. (Refer to figure 49.) The angle of bank will be most nearly equal in which positions?

- A - 3 and 7.
- B - 1 and 5.
- C - 4 and 6.

3988. (Refer to figure 50.) With the wind as shown and the bank constant throughout the turn, which of the ground tracks illustrated would be most probable?

- A- 1.
- B- 2.
- C- 4.

3989. (Refer to figure 51.) In which positions will the groundspeeds be equal?

- A - 2 and 5.
- B - 1 and 6, 2 and 5.
- C - 1 and 6, 2 and 5, 3 and 4.

3990. (Refer to figure 51.) During S-turn practice, which positions require the steeper angle of bank?

- A - 4 and 5.
- B - 3 and 4.
- C - 2 and 5.

3991. (Refer to figure 51.) Proper execution of S-turns across a road requires that the aircraft be crabbed into the wind the greatest amounts at which points?

- A - 3 and 4.
- B - 2 and 5.
- C - 1 and 6.

3992. (Refer to figure 52.) While practicing S-turns, a consistently smaller half-circle is made on one side of the road than on the other, and this turn is not completed before crossing the road or reference line. This would most likely occur in turn

- A- 1-2-3 because the bank is decreased too rapidly during the latter part of the turn.
- B- 4-5-6 because the bank is increased too rapidly during the early part of the turn.
- C- 4-5-6 because the bank is increased too slowly during the latter part of the turn.

3993. In properly coordinated eights-on-pylons, if the reference point is behind the pylon, it means the

- A- angle of bank is too shallow.
- B- airplane is above the pivotal altitude.
- C- airplane is below the pivotal altitude.

3994. The pivotal altitude for eights-on-pylons is dependent primarily upon the

- A- groundspeed.
- B- true airspeed.
- C- distance from the pylon.

3995. If the wing moves behind the pylon during properly coordinated eights-on-pylons, the airplane is

- A- flying too fast.
- B- below pivotal altitude.
- C- above pivotal altitude.

3996. (Refer to figure 53.) While performing eights-on-pylons, the turn-and-slip indicator appears as shown in "2." The pilot must

- A- increase altitude to obtain the correct pivotal altitude, and correct the skidding turn.
- B- decrease altitude to obtain the correct pivotal altitude, and correct the slipping turn.
- C- decrease the bank to hold the reference point on the pylon without slipping, because the radius of turn is too small.

3997. (Refer to figure 53.) Misuse of rudder in attempting to hold the pylon during the performance of eights-on-pylons will result in which turn-and-slip indication?

- A— "2" if above or below pivotal altitude.
- B— "1" if below pivotal altitude; "2" if above pivotal altitude.
- C— "1" if above pivotal altitude; "2" if below pivotal altitude.

3998. The objective of a cross-control stall demonstration is to

- A- emphasize the hazard of an excessive slip during a landing approach.
- B- teach the proper recovery technique should this type of stall occur during final approach.
- C- show the effect of improper control technique and emphasize the importance of coordinated control when making turns.

3999. Two distinct flight situations should be covered when teaching slow flight. These are the establishment and maintenance of

- A- airspeeds appropriate for landing approaches, and flight at minimum controllable speeds.
- B- an airspeed which gives a stall warning indication, and a speed at which complete recovery can be made from stalls.
- C- a speed at which the airplane is operating on the back side of the power curve, and a speed at which the elevator control can be held full-back with no further loss of control.

4000. The primary purpose of practicing operations at minimum controllable airspeeds is to enable students to

- A- safely fly airport traffic patterns at various airspeeds.
- B- develop proficiency at anticipating the onset of power-on stalls.
- C- become familiar with appropriate control techniques for such speeds, and the rapidity with which control effectiveness can be lost.

4001. If an accelerated stall occurs in a steep turn, how will the airplane respond?

- A- The inside wing stalls first because it is flying at a higher angle of attack.
- B- The outside wing stalls first because it is flying at a higher angle of attack.
- C- In a slip, the high wing stalls first; in a skid, the low wing stalls first; in coordinated flight, both wings stall at the same time.

4002. If an accelerated stall occurs during a steep turn, in which direction would the airplane tend to roll?

- A- Toward the inside of the turn.
- B- Toward the outside of the turn.
- C- The direction of roll depends on whether the airplane is slipping, skidding, or in coordinated flight.

4003. Students should be taught that throughout a level, **720°** steep turn to the right, the rudder is normally used to

- A- prevent yawing.
- B- control the rate of turn.
- C- hold the aircraft in the turn once it is established.

4004. Pilots who initiate a chandelle with a bank that is too steep will most likely

- A- stall before completing the maneuver.
- B- turn more than 180° before completing the **rollout**.
- C- perform a comparatively level steep turn with a nose-high **rollout** at the **180°** point.

4005. What may occur if the initial bank is too shallow when performing a chandelle?

- A- Completing the maneuver with excessive airspeed.
- B- Stalling the aircraft before reaching the 180° point.
- C- Completing the maneuver with too low a pitch attitude.

4006. When performing a chandelle, where should maximum pitch occur?

- A- **45°** point.
- B- 90° point.
- C- 180° point.

4007. Which best describes pitch and bank during the first 90° of a chandelle?

- A- Changing pitch and bank.
- B- Constant pitch and bank.
- C- Constant bank and changing pitch.

4008. Which best describes the pitch and bank during the second 90° of a chandelle?

- A- Changing pitch and bank.
- B- Constant pitch and changing bank.
- C- Constant bank and changing pitch.

4009. When performing a lazy eight, where should the maximum **pitchup** attitude occur?

- A- 45° point.
- B- 90° point.
- C- **180°** point.

4010. When performing a **lazy** eight, when should the aircraft be at minimum airspeed?

- A- **45°** point.
- B- 90° point.
- C- 180° point.

4011. When performing a lazy eight, where should the maximum pitchdown attitude occur?

- A- **90°** point.
- B- **135°** point.
- C- **180°** point.

4012. When performing a **lazy** eight, when should the maximum altitude occur?

- A- **45°** point.
- B- 90° point.
- C- **180°** point.

4013. When performing a lazy eight, when should the altitude be the same as the entry altitude?

- A- 90° point.
- B- **135°** point.
- C- **180°** point.

4014. What should occur at the 90° point of a lazy eight?

- A- Airspeed and altitude should be the same as at entry.
- B- Maximum pitch attitude, minimum airspeed, and minimum bank.
- C- Steepest bank, minimum airspeed, maximum altitude, and level pitch attitude.

4015. What would cause the 45° point to be reached before the maximum **pitchup** attitude during a lazy eight?

- A- Beginning with too slow a rate of roll.
- B- Beginning with too rapid a rate of roll.
- C- Allowing the airspeed to remain too high causing the rate of turn to increase.

4016. Which is the most probable result if a pilot initiates the climbing turn portions of the lazy eight with banks that are too steep?

- A- Completing each **180°** change of direction with a net gain of altitude.
- B- Attaining a pitch attitude that is too steep and stalling at the top of the climbing turn.
- C- Turning at a rate too fast for the rate of climb and therefore, completing each **180°** change of direction with excessive airspeed.

4017. At what point, if ever, in a lazy eight is it most likely that it will be necessary to exert opposing aileron and rudder pressures in order to maintain coordinated flight?

- A- At the point of slowest speed.
- B- At the point of fastest speed.
- C- At the point of lowest pitch attitude.

4018. (Refer to figure 53.) During practice of lazy eights, the most probable cause of the uncoordinated situation at the completion of **90°** of turn (indicated by the turn-and-slip indicator shown in "1") is the

- A- application of cross-control pressure.
- B- use of too much right rudder control pressure.
- C- failure to constantly adjust control pressures for torque and airspeed.

4019. Which would likely result in a slipping turn?

- A- Not holding bottom rudder in a turn.
- B- Increasing the rate of turn without using rudder.
- C- Increasing the rate of turn without increasing bank.

4020. Choose the true statement pertaining to a slip or skid in an airplane.

- A- A skid occurs when the rate of turn is too slow for the amount of bank being used.
- B- In a left climbing turn, if insufficient right rudder is applied to compensate for the increased torque effect, a slip will result.
- C- In a right descending turn, if excessive **left** rudder is applied to compensate for the decreased torque effect, a slip will result.

4021. During the full-flare portion of a power-off landing, the rotor RPM tends to

- A- increase initially.
- B—** decrease initially.
- C- decrease during high density altitude days, and increase during low density altitude days.

4022. During a climbing turn, the engine RPM is at the desired setting, but the manifold pressure is higher than desired. To maintain the desired engine RPM and correct the manifold pressure, what initial control action should be taken?

- A- Decrease the collective pitch only.
- B- Decrease the collective pitch and decrease the throttle.
- C- Decrease the collective pitch and increase the throttle.

4023. The collective pitch control should be used to

1. correct for loss of lift during level turns at altitude.
2. maintain desired engine power.
3. correct a high **rotor** RPM during autorotations from altitude.

The correct statement(s) **is(are)**

- A - 1 and 2 only.
- B - 1, 2, and 3.
- C - 2 only.

4024. The antitorque pedals should be used to

1. maintain heading during cruise flight.
2. correct for loss of torque during autorotations.
3. maintain heading during crosswind takeoffs and approaches.

The correct statements are

- A- 2 and 3 only.
- B—** 1 and 3 only.
- C- 1, 2, and 3.

4025. At the onset of blade stall vibration, which corrective measures should the pilot take?

- A- Reduce collective pitch, increase rotor RPM, and reduce forward airspeed.
- B- Reduce collective pitch, decrease rotor RPM, and reduce forward airspeed.
- C- Reduce collective pitch, increase rotor RPM, and increase forward airspeed.

4026. What are the major indications of an incipient retreating blade stall situation, in order of occurrence?

- A- Low-frequency vibration, **pitchup** of the nose, and a tendency for the helicopter to roll.
- B- High-frequency vibration, pitchdown of the nose, and a tendency for the helicopter to roll.
- C- Slow **pitchup** of the nose, high-frequency vibration, and a tendency for the helicopter to roll.

4027. When operating at high forward airspeed, retreating blade stall is more likely to occur under conditions of

- A- high gross weight, high RPM, and smooth air.
- B- high gross weight, low RPM, and turbulent air.
- C- low gross weight, high RPM, and high density altitude.

4028. If complete power failure occurs **while** at cruising altitude, the collective pitch should be lowered, as necessary, to

- A- uncouple the main rotor system from the engine.
- B- engage the freewheeling unit so that proper rotor RPM can be maintained.
- C- reduce the pitch on all main rotor blades so that proper rotor RPM can be maintained.

4029. Recovery from settling with power should be initiated by

- A- decreasing forward airspeed **and/or** partially raising the collective pitch.
- B- increasing forward airspeed and/or partially lowering the collective pitch.
- C—** increasing forward airspeed and/or partially raising the collective pitch.

4030. Under which situation is a helicopter most likely to enter the condition known as settling with power?

- A- **While** maintaining altitude and a forward airspeed of less than 10 MPH.
- B- While maintaining forward cruising airspeed with a rate of descent in excess of 300 feet per minute.
- C- While maintaining a forward airspeed of less than 10 MPH with a rate of descent in excess of 300 feet per minute.

4031. Which situation would require the highest power setting to hover?

- A- Headed downwind in moderate windspeeds.
- B- Headed crosswind in moderate windspeeds.
- C- Over tall grass in zero wind conditions.

4032. The antitorque system fails during cruising flight and a powered approach landing is commenced. If the helicopter yaws to the right just prior to touchdown, what could the pilot do to help swing the nose to the left?

- A- Increase the throttle.
- B- Decrease the throttle.
- C—** Increase collective pitch.

4033. What corrective action should be taken if the antitorque system should fail while at a hover?

- A- Close the throttle and autorotate.
- B- Apply left pedal as necessary to stop the torque-induced turn to the right.
- C- Lower the collective pitch to reduce the load on the main rotor blades.

4034. To taxi on the surface in a safe and efficient manner, helicopter pilots should use the

- A- cyclic pitch to control starting, taxi speed, and stopping.
- B- collective pitch to control starting, taxi speed, and stopping.
- C- cyclic pitch to maintain heading during crosswind conditions.

4035. To taxi on the surface in a safe efficient manner, one should use the cyclic pitch to

- A- control taxi speed.
- B- maintain heading during crosswind conditions.
- C- correct for drift during crosswind conditions.

4036. If excessive right pedal is applied during an autorotative turn to the right, the nose of the helicopter will tend to

- A- pitch up and the rotor RPM will tend to increase.
- B- pitch down and the rotor RPM will tend to increase.
- C- pitch down and the rotor RPM will tend to decrease.

4037. Using right pedal to assist a right turn during an autorotative descent will probably result in what actions?

- A- **Pitchup** of the nose, increase in rotor RPM, decrease in sink rate, and decrease in indicated airspeed.
- B- Pitchdown of the nose, increase in the rotor RPM, increase in sink rate, and decrease in indicated airspeed.
- C- Pitchdown of the nose, decrease in the rotor RPM, increase in sink rate, and increase in indicated airspeed.

4036. Choose the most correct statement pertaining to slips and skids during helicopter flight.

- A- A skid occurs when too much rudder is applied in the direction opposite the turn.
- B- A skid occurs when the rate of turn is too slow for the amount of bank being used.
- C- In a right descending turn, if **insufficient** right pedal is applied to compensate for the decreased torque effect, a slip will result.

4039. After attaining effective translational lift during a normal takeoff, additional forward cyclic is required as the airspeed increases. Why is this action required?

- A- To counteract gyroscopic precession.
- B- To counteract the increase in lift which would result in the nose rising.
- C- To counteract the dissymmetry of lift which causes the helicopter to roll to the left.

4640. During a normal approach to a hover, the cyclic pitch control is used primarily to

- A- maintain heading.
- B- control rate of closure.
- C- control angle of descent.

4041. Which statement best describes the function of the controls during a powered approach to hover?

- A- Collective pitch primarily controls angle of descent; cyclic pitch primarily controls groundspeed.
- B- Cyclic pitch primarily controls angle of descent and groundspeed; collective pitch primarily controls rate of descent.
- C- Collective pitch primarily controls angle of descent; rotor RPM primarily controls rate of descent; cyclic pitch primarily controls groundspeed.

4042. When autorotating during high density altitude or strong gusty wind conditions, a slightly higher-than-normal airspeed is recommended because the

- A- resulting slower rate of descent will allow more time for the pilot to estimate the touchdown point.
- B- resulting glide angle will approximate that of a slightly reduced airspeed under conditions of light loads, low density altitude, or calm wind.
- C- lower rotor speed will cause the rate of descent to approximate that of a slightly increased rotor speed under conditions of light loads, low density altitude, or calm wind.

4643. During a flare autorotative descent and landing, additional right pedal is required to maintain heading after initial collective pitch is applied. This action is necessary because of

- A- gyroscopic precession.
- B- the reduction in rotor RPM.
- C- translating tendency of helicopters during autorotation.

4644. During a running takeoff in a crosswind, which describes proper control technique?

- A- Pedals control both heading and direction of movement.
- B- Heading is maintained with cyclic; direction of movement (**groundpath** or track) is maintained with pedals.
- C- Heading is maintained with pedals; direction of movement (groundpath or track) is maintained with cyclic.

4045. How should the rotor RPM be controlled during a running landing?

- A- Normal operating RPM should be maintained until the helicopter stops, primarily to ensure adequate directional control.
- B- The rotor RPM should be permitted to decrease slowly, once the helicopter is on the ground, to allow the full weight of the helicopter to settle on the skids.
- C- Normal operating RPM should be maintained during the landing roll or skid, primarily to ensure that sufficient lift is available should an emergency develop.

4646. When making a slope landing, the cyclic pitch control should be used to

- A- lower the downslope skid to the ground.
- B- hold the **upslope** skid against the slope.
- C- place the rotor disc parallel to the slope.

4047. The steepness of the slope on which a helicopter with skid-type landing gear can land is most dependent on

- A- its gross weight.
- B- the position of the CG.
- C- the amount of lateral cyclic stick travel available.

4648. As the **upslope** skid touches the ground during a slope landing, the

- A- cyclic pitch control should remain stationary to keep the aircraft from moving.
- B—** collective pitch control should be used to lower the downslope skid to the ground.
- C—** collective pitch should remain stationary and the cyclic pitch control should be used to lower the downslope skid to the ground.

4649. Which statement pertaining to rapid decelerations (quick stops) is most accurate?

- A- The primary purpose of this maneuver is to lose effective translational lift.
- B—** The rotor RPM will normally tend to increase during the entry and tend to decrease during the completion of the maneuver.
- C—** The nose of the helicopter will normally tend to yaw to the right during the entry and tend to yaw to the left during the completion of the maneuver.

4050. Dual instruction and solo practice on quick stops should usually be accomplished headed upwind

- A- between 100 feet and 200 feet above the surface.
- B—** and only during low density altitude conditions.
- C- at an altitude that will permit a safe clearance between the tail rotor and the ground throughout the maneuver.

4051. During a pinnacle approach to a rooftop heliport under conditions of turbulence and high wind, the pilot should make a

- A- shallow approach, maintaining a constant line of descent with cyclic applications.
- B—** normal approach, maintaining a **slower-than-normal** rate of descent with cyclic applications.
- C- steeper-than-normal approach, maintaining the desired angle of descent with collective applications.

4052. Select the true statement concerning gyroplane taxi procedures.

- A- Avoid abrupt control movements when blades are turning.
- B- The cyclic stick should be held slightly aft of neutral at all times.
- C- The cyclic stick should be held in the neutral position at all times.

4053. Which statement is true concerning a gyroplane?

- A- Rotor RPM will remain constant during changes in airspeed while descending.
- B- A gyroplane is capable of getting into a settling-with-power situation much the same way as a helicopter.
- C- A gyroplane can safely descend vertically or move backward with respect to ground references during a descent if altitude permits.

4054. In the event a running landing is performed during crosswind conditions, proper landing technique requires that the

- A- longitudinal axis of the gyroplane be parallel to the runway.
- B- direction of gyroplane motion and heading coincide with runway direction.
- C- lateral axis of the gyroplane be parallel to the gyroplane's direction of motion.

4055. A running or roll-on landing in a gyroplane should be considered

- A- an unsafe maneuver if the airspeed is less than 45 MPH.
- B- an unsafe maneuver except in calm or light wind conditions.
- C- a normal and acceptable maneuver if proper conditions relating to landing surface and groundspeed exist.

4056. Which instrument provides the most pertinent information (primary) for pitch control in straight-and-level flight?

- A- Altimeter.
- B- Attitude indicator.
- C- Airspeed indicator.

4057. What instrument(s) is (are) supporting bank instrument(s) when entering a constant airspeed climb from straight-and-level flight?

- A- Heading indicator.
- B- Turn coordinator and heading indicator.
- C- Attitude indicator and turn coordinator.

4058. Which instruments are considered primary and supporting for bank, respectively, when establishing a level standard rate turn?

- A- Turn coordinator and heading indicator.
- B- Attitude indicator and turn coordinator.
- C- Turn coordinator and attitude indicator.

4059. If an airplane is in an unusual flight attitude and the attitude indicator has exceeded its limits, which instruments should be relied upon to determine pitch attitude before recovery?

- A- Airspeed indicator and altimeter.
- B- Turn indicator and vertical speed indicator.
- C- Vertical speed indicator and airspeed indicator.

4060. Which is the correct sequence for recovery from a spiraling, nose-low, increasing airspeed, unusual flight attitude?

- A- Increase pitch attitude, reduce power, and level wings.
- B- Reduce power, correct bank attitude, and raise nose to a level attitude.
- C- Reduce power, raise nose to a level attitude, and correct bank attitude.

4061. The visual glidepath of a **2-bar VASI** provides safe obstruction clearance within plus or minus 10° of the extended runway centerline and to a distance of how many miles from the runway threshold?

- A- 4 NM.
- B- 6 NM.
- C- 10 NM.

4062. Which indications would a pilot see while approaching to land on a runway served by a 2-bar VASI?

- A- If below the glidepath, the near bars will be red and the far bars white.
- B- If on the glidepath, the near bars will appear red and the far bars will appear white.
- C- If departing to the high side of the glidepath, the far bars will change from red to pink to white.

4063. When on the glidepath of a standard 2-bar VASI, the far lights should be

- A- pink and the near lights should be white.
- B- white and the near lights should be red.
- C- red and the near lights should be white.

4064. When on the upper glidepath of a 3-bar VASI what would be the colors of the lights?

- A- All three sets of lights would be white.
- B- The near bar is white and the middle and far bars are red.
- C- The near and middle bars are white and the upper bar is red.

4065. An on-glidepath indication from a **tri-color** VASI is

- A- a green light signal.
- B- a white light signal.
- C- an amber light signal.

4066. An above-glidepath indication from a tri-color VASI is

- A- a pink light signal.
- B- a white light signal.
- C- an amber light signal.

4067. A slightly low indication on a **PAPI** glidepath is indicated by

- A- four red lights.
- B- one red light and three white lights.
- C- one white light and three red lights.

4068. The last 2,000 feet of runway edge lights on an instrument runway are colored

- A- red.
- B- white.
- C- amber.

4069. A series of continuous red lights in the runway centerline lighting indicates that

- A- 3,000 feet of runway remain.
- B- 1,000 feet of runway remain.
- C- one-half of the runway remains.

4070. An airport has pilot controlled lighting but runways without approach lights. How many times should you key your microphone to turn on the MIRL at medium intensity?

- A- 5 clicks.
- B- 3 clicks.
- C- None, the MIRL is left on all night.

4071. A military airfield can be identified by

- A- a white and red rotating beacon.
- B- white flashing sequence lights (strokes).
- C- a green and dual-peaked white rotating beacon.

4072. An unlighted land airport is indicated by a rotating beacon that is colored

- A- white.
- B- green.
- C- white and green.

4073. During the daylight hours, the operation of a rotating beacon at an airport located within a control zone means

- A- the control tower is not in operation.
- B- right-hand traffic is in use at the airport.
- C- weather conditions are below basic VFR weather minimums.

4074. The numbers 8 and 26 on the approach ends of the runway indicate that the runway is orientated approximately

- A- **008°** and **026°** true.
- B- **080°** and **260°** true.
- C- **080°** and **260°** magnetic.

4075. What does a series of arrows painted on the approach end of a runway signify?

- A- That area is restricted solely to taxi operations.
- B- That portion of the runway is not suitable for landing.
- C- That portion of the runway is the designated touchdown zone.

4076. (Refer to figure 54.) If a landing were to be made on Rwy 12, which statement would be true concerning runway markings?

- A- Area A should be used for landings in small airplanes only.
- B- All aircraft must terminate their landing roll prior to reaching the intersection of Rwys 12-30 and Rwys **17R-35L**.
- C- Area B is the displaced threshold of Rwy 12 and indicates the beginning portion of the runway usable for landing.

4077. (Refer to figure 54.) What is the difference between area A and area E on the airport?

- A- Both areas A and E may be used for taxi and takeoff.
- B- Area A may be used for taxi and **takeoff**; area E may only be used as an overrun.
- C- Area A may only be used for taxi; area E may be used for all operations except landings.

4078. When approaching **taxiway** holding lines from the side with the continuous lines, the pilot

- A- may continue taxiing.
- B- should not cross the lines without ATC clearance.
- C- should continue taxiing until all parts of the aircraft have crossed the lines.

4079. The UNICOM frequency at airports with a control tower is

- A- 123.0.
- B- 122.95.
- C- 122.8.

4080. As standard operating practice, all inbound traffic to an airport without a control tower should continuously monitor the appropriate facility from a distance of

- A- 25 miles.
- B- 20 miles.
- C- 10 miles.

4081. When landing at an airport that does not have a tower, FSS, or UNICOM, you should broadcast your intentions on

- A- 122.9 MHz.
- B- 123.0 MHz.
- C- 123.6 MHz.

4082. Absence of the sky condition and visibility on an **ATIS** broadcast indicates that

- A- weather conditions are at or above VFR minimums.
- B- the sky condition is clear and visibility is unrestricted.
- C- the ceiling is at least 5,000 feet and visibility is 5 miles or more.

4083. When are **ATIS** broadcasts updated?

- A- Only when the ceiling and/or visibility changes by a reportable value.
- B- Every 30 minutes if weather conditions are below basic VFR; otherwise, hourly.
- C- Upon receipt of any official weather, regardless of content change or reported values.

4084. While flying in a TCA, you receive the following radar traffic advisory:

“TRAFFIC 11 O’CLOCK, 1 MILE, EASTBOUND....”

You should look for this traffic

- A- behind the left wingtip.
- B- between the nose of the aircraft and the left wingtip.
- C- between the nose of the aircraft and the right wingtip.

4085. When an air traffic controller issues radar **traffic** information in relation to the **12-hour** clock, the reference the controller uses is the aircraft’s

- A- true course.
- B- ground track.
- C—** magnetic heading.

4086. Which action is appropriate if a pilot becomes involved in a hijacking?

- A- Transmit code H on 121.5.
- B- Set code 7500 on the aircraft transponder.
- C- Append the code word PAPA to the aircraft call sign during all radio transmissions.

4087. Which transponder code should the pilot of a civilian aircraft never use?

- A- 7500.
- B- 7600.
- c- 7777.

4088. If the aircraft's radio fails, what is the recommended procedure when landing at a controlled airport?

- A- Select 7700 on your transponder, fly a normal traffic pattern, and land.
- B- Flash your landing lights and make shallow banks in opposite directions while circling the airport.
- C- Observe the **traffic** flow, enter the pattern, and look for a light signal from the tower.

4089. The recommended entry position to an airport **traffic** pattern is

- A- 45° to the base leg just below **traffic** pattern altitude.
- B- to enter 45° at the midpoint of the downwind leg at **traffic** pattern altitude.
- C- to cross directly over the airport at **traffic** pattern altitude and join the downwind leg,

4090. (Refer to figure 55.) The segmented circle indicates that the airport traffic pattern is

- A- left-hand for Rwy 17 and right-hand for Rwy 35.
- B- right-hand for Rwy 35 and right-hand for Rwy 9.
- C- left-hand for Rwy 35 and right-hand for Rwy 17.

4091. (Refer to figure 55.) Which runway and **traffic** pattern should be used as indicated by the wind cone in the segmented circle?

- A- Right-hand traffic on Rwy 17.
- B- Left-hand traffic on Rwy 27 or Rwy 35.
- C- Left-hand **traffic** on Rwy 35 or right-hand traffic on Rwy 27.

4092. If the control tower wants to instruct a vehicle to proceed, the light gun signal will be

- A- steady green.
- B- flashing green.
- C- flashing white.

4093. To acknowledge light gun signals from the tower at night, the pilot should

- A- move the control surfaces.
- B- blink landing or navigation lights.
- C- S-turn on the ground or roll back and forth in the air.

4094. Pilots are encouraged to turn on their landing lights when operating below 10,000 feet, day or night, and when operating within

- A- a terminal control area.
- B- 10 miles of any airport.
- C- 5 miles of a controlled airport.

4096. Pilots are encouraged to turn on the aircraft rotating beacon

- A- just prior to taxi.
- B- just prior to takeoff.
- C- any time the engines are in operation.

4096. When information is disseminated for a navigational facility, it will be located in

- A- FDC **NOTAMS**.
- B- **NOTAM (L)** distribution.
- C- **NOTAM (D)** distribution.

4097. When information is disseminated about a runway closure, it will be located in

- A- FDC **NOTAMS**.
- B- **NOTAM (L)** distribution.
- C- **NOTAM (D)** distribution.

4098. How long will an FSS hold a VFR flight plan past the proposed departure time?

- A- 30 minutes.
- B- 1 hour.
- C- 2 hours.

4099. If an aircraft has a transponder, encoding altimeter, and DME, the proper equipment **suffix** to be entered on a flight plan is

- A - A
- B- R.
- c - u .

4100. How much time do you have to close a VFR flight plan before search and rescue procedures are initiated?

- A- One hour after your **ATA**.
- B- One-half hour after landing.
- C- One-half hour after your ETA

4101. **If** an aircraft has a transponder, encoding altimeter, and RNAV, the proper equipment suffix to be entered on a flight plan is

- A- A.
- B- R.
- C - **W**.

4102. How does the wake turbulence vortex circulate around each wingtip?

- A- Inward, upward, and around each tip.
- B- Inward, upward, and counterclockwise.
- C- Outward, upward, and around each tip.

4103. What effect would a crosswind of 5 knots or less have on the wingtip vortices generated by a large aircraft that had just taken off?

- A- A light crosswind would rapidly dissipate the strength of both vortices.
- B- The upwind vortex would tend to remain on the runway longer than the downwind vortex.
- C- Both vortices would move downwind at a greater rate than if the surface wind was directly down the landing runway.

4104. During a takeoff made behind a departing large jet airplane, the pilot can minimize the hazard of wingtip vortices by

- A- remaining below the jet's flightpath until able to turn clear of its wake.
- B- extending the takeoff roll and not rotating until well beyond the jet's rotation point.
- C- being airborne prior to reaching the jet's flightpath until able to turn clear of its wake.

4105. When landing behind a large jet aircraft, at which point on the runway should you plan to land?

- A- Beyond the jet's touchdown point.
- B- At least 1,000 feet beyond the jet's touchdown point.
- C—** If any crosswind, land on the windward side of the runway and prior to the jet's touchdown point.

4106. Due to the effects of wake turbulence, what minimum separation does ATC provide for a small aircraft landing behind a heavy jet?

- A- 4 miles.
- B- 5 miles.
- C- 6 miles.

4107. What can a pilot expect when landing at an airport located in the mountains?

- A- Higher true airspeed and longer landing distance.
- B- Higher indicated airspeed and shorter landing distance.
- C- **Faster groundspeed and increased propeller efficiency.**

4108. Which statement is true regarding alcohol in the human system?

- A- Alcohol renders a pilot more susceptible to hypoxia.
- B- Small amounts of alcohol will not impair flying skills.
- C- Coffee helps metabolize alcohol and alleviates a hangover.

4109. If an individual has gone scuba diving which has not required a controlled ascent and will be flying to cabin pressure altitudes of 8,000 feet or less, the recommended waiting time is at least

- A- 2 hours.
- B- 4 hours.
- C- 8 hours.

4110. If an individual has gone scuba diving which has required a controlled ascent and will be flying to cabin pressure altitudes of 8,000 feet or less, the recommended waiting time is at least

- A- 8 hours.
- B- 12 hours.
- C- 24 hours.

4111. After scuba diving and then planning a flight to cabin pressure altitudes above 8,000 feet, an individual should wait at least

- A- 12 hours.
- B- 18 hours.
- C- 24 hours.

4112. Which would most likely result in hyperventilation?

- A- Insufficient oxygen.
- B- Excessive carbon dioxide.
- C- Insufficient carbon dioxide.

4113. Rapid or extra deep breathing while using oxygen can cause a condition known as

- A- hypoxia.
- B- aerotitis.
- C- hyperventilation.

4114. A pilot should be able to overcome the symptoms or avoid future occurrences of hyperventilation by

- A- slowing the breathing rate, breathing into a bag, or talking aloud.
- B- increasing the breathing rate in order to increase lung ventilation.
- C- refraining from the use of over-the-counter remedies and drugs such as antihistamines, cold tablets, tranquilizers, etc.

4115. A rapid acceleration can create the illusion of being in a

- A- left turn.
- B- **noseup** attitude,
- C- **nosedown** attitude.

4116. An illusion, that the aircraft is at a higher altitude than it actually is, is produced by

- A- atmospheric haze.
- B- upsloping terrain.
- C- downsloping terrain.

4117. Dark adaptation is impaired by exposure to

- A- carbon dioxide.
- B- vitamin A in the diet.
- C- cabin pressure altitudes above 5,000 feet.

4118. Which procedure is recommended to prevent or overcome spatial disorientation?

- A- Avoid steep turns and rough control movements.
- B- Rely entirely on the indications of the flight instruments.
- C- Reduce head and eye movements to the greatest extent possible.

4119. Which technique should a student be taught to scan for **traffic** to the right and left during straight-and-level flight?

- A- Continuous sweeping of the windshield from right to left.
- B- Concentrate on relative movement detected in the peripheral vision area.
- C- Systematically focus on different segments of the sky for short intervals.

4120. What effect does haze have on the ability to see **traffic** or terrain features during flight?

- A- Haze causes the eyes to focus at infinity.
- B- The eyes tend to overwork in haze and do not detect relative movement easily.
- C- All **traffic** or terrain features appear to be farther away than their actual distance.

4121. Information concerning parachute jumping sites may be found in the

- A - **NOTAM's**.
- B- Airport/Facility Directory.
- C- Graphic Notices and Supplemental Data.

4122. (Refer to figure 56.) What is the elevation of the DFW VORTAC?

- A- 487 feet MSL.
- B- 490 feet MSL.
- C- 560 feet MSL.

4123. (Refer to figure 56.) On what frequency can a pilot activate the approach lights at **Redbird** Field when the control tower is not in operation?

- A- 120.15.
- B- 120.3.
- C- 122.95.

4124. (Refer to figure 56.) Select the correct statement concerning Dallas Love Field.

- A- Right traffic is in effect for all runways.
- B- The runway gradient for Rwy 18 is less than **.3** percent.
- C- The touchdown zone elevation for Rwy 13R is 53 feet.

4125. (Refer to figure 56.) At what time of day does the tower shut down at **Redbird** Field?

- A- 1000Z.
- B- 0400 local.
- C- 2200 local.

4126. Which statement concerning hypoxia is true?

- A- Hypoxia is caused by nitrogen bubbles in the joints and bloodstream.
- B- Tingling of the skin and a false sense of security may be symptoms of hypoxia.
- C- Forcing oneself to concentrate on the flight instruments will help to overcome the effects of hypoxia.

4127. Which occurs when climbing above 28,000 feet in an unpressurized airplane without supplemental oxygen?

- A- Gases trapped in the body contract and prevent nitrogen from escaping the bloodstream.
- B- The pressure in the middle ear becomes less than the atmospheric pressure in the cabin.
- C- The oxygen pressure within the lungs cannot be maintained without an increase in inhaled oxygen pressure.

4128. Hypoxia is the result of

- A- shortage of oxygen in the body.
- B- **insufficient oxygen** in the air.
- C- excessive nitrogen in the bloodstream.

4129. One aid in increasing night vision effectiveness would be to

- A- look directly at objects.
- B- force the eyes to view off center.
- C— increase intensity of interior lighting.

4130. What suggestion could you make to students who are experiencing motion sickness?

- A- Recommend taking medication to prevent motion sickness.
- B- Have the students lower their head, shut their eyes, and take deep breaths.
- C- Tell the students to avoid unnecessary head movement and to keep their eyes on a point outside the aircraft.

4131. Motion sickness is caused by

- A- continued stimulation of the tiny portion of the inner ear which controls sense of balance.
- B- an instability in the brain cells which affects balance and will generally be overcome with experience.
- C- the movement of an aircraft causing the stomach to create an acid substance which causes the stomach lining to contract.

4132. A high degree of aircraft control is required to ensure safe flight. Select the instructing technique that is recommended to help a student develop this skill.

- A- Use of distractions during training flight.
- B- Scheduling the student with several different instructors during flight training.
- C- Demonstrating each new maneuver several times before permitting student practice.

4133. During training flights, an instructor should interject distractions to determine if the student can

- A- be easily discouraged.
- B- learn despite stressful conditions.
- C- maintain aircraft control while his/her attention is diverted.

4134. During S-turn practice, an acceptable example of interjecting a distracting situation is to request the student to

- A- fly at minimum controllable airspeed.
- B- change airspeed during course reversal.
- C— identify certain objects on the ground.

4135. What is an effective way to prevent a collision hazard in the **traffic** pattern?

- A- Enter the pattern in a descent.
- B- Maintain the proper traffic pattern altitude and continually scan the area.
- C- Rely on radio reports from other aircraft who may be operating in the traffic pattern.

4136. The most effective technique to use for detecting other aircraft at night is to

- A- turn the head and sweep the eyes rapidly over the entire visible region.
- B- avoid staring directly at the point where another aircraft is suspected to be flying.
- C- avoid scanning the region below the horizon so as to avoid the effect of ground lights on the eyes.

4137. Most midair collision accidents occur during

- A- hazy days.
- B- clear days.
- C- cloudy nights.

4138. What consideration should be given in the choice of a **towplane** for use in aerotows?

- A- Stall speed of the towplane.
- B- Gross weight of the glider to be towed.
- C- Towplane's low-wing loading and low-power loading.

4139. The reason for retaining water ballast while thermals are strong and dumping the water when thermals weaken is to

- A- decrease forward speed.
- B- increase forward speed.
- C- decrease the rate of descent.

4140. **What** is the proper speed to fly when passing through lift with no intention to work the lift?

- A- Best lift/drag speed.
- B- Minimum sink speed.
- C— Maximum safe speed.

4141. When flying into a strong headwind on a long glide back to the airport, the recommended speed to use is the

- A- best glide speed.
- B- minimum sink speed.
- C- best lift/drag speed plus half the estimated windspeed at the glider's flight altitude.

4142. A rule of thumb for flying a final approach is to maintain a speed that is

- A- 50 percent above the glider's stall speed, regardless of windspeed.
- B- twice the glider's stall speed plus half the estimated windspeed.
- C- 50 percent above the glider's stall speed plus half the estimated windspeed.

4143. During an auto launch, the pitch angle of the glider should not exceed

- A- **10°** at 50 feet, **20°** at 100 feet, and **45°** at 200 feet.
- B- 15" at 50 feet, 20" at 100 feet, and 40" at 200 feet.
- C- 15" at 50 feet, 30" at 100 feet, and 45" at 200 feet.

4144. At what point during an auto tow should the glider pilot establish the maximum pitch attitude for the climb?

- A- 200 feet above the ground.
- B- 100 feet above the ground.
- C- Between 300 and 400 feet above the ground.

4146. Unless adequate speed control is maintained during the turn to base and the final approach for a landing into the wind, which would most likely occur if a steep wind gradient existed?

- A- The desired landing spot would be undershot or the glider would stall.
- B- The airspeed on final approach would increase, causing the glider to overshoot the desired landing spot.
- C— The wingtip on the outside of the turn would stall before the wingtip on the inside of the turn.

4146. If swirling dust, leaves, or debris indicate a strong thermal on the final approach to a landing, it is recommended that the glider pilot

- A- open the spoilers and reduce the airspeed.
- B- close the spoilers and increase the airspeed.
- C- open the spoilers and maintain a constant airspeed.

4147. With regard to two or more gliders flying in the same thermal, which statement is true?

- A- All turns should be to the right.
- B- Turns should be in the same direction as the highest glider.
- C- Turns should be made in the same direction as the first glider to enter the thermal.

4148. Which is true relating to the direction in which turns should be made during slope soaring?

- A- All reversing turns should be made to the left.
- B- All turns should be made downwind toward the slope.
- C- All reversing turns should be made into the wind away from the slope.

4149. When making an off-field landing, it is recommended that the landing be accomplished

- A- in pastures which are seldom cultivated.
- B- uphill, if possible, regardless of the wind direction.
- C—** in cultivated fields where the crops have not yet been harvested.

4150. Which would most likely ensure a safe off-field landing?

- A- Landing into the wind, regardless of the type or slope of the terrain.
- B—** Landing in a pasture or noncultivated field rather than one in cultivation and whose crops have been harvested.
- C- Maintaining an approach airspeed of at least 50 percent above the glider's stall speed plus half the estimated windspeed.

APPENDIX 1

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT MATTER KNOWLEDGE CODES

To determine the knowledge area in which a particular question was incorrectly answered, compare the subject matter code(s) on AC Form 8080-2, Airmen Written Test Report, to the subject matter outline that follows. The total number of test items missed may differ from the number of subject matter codes shown on the AC Form 8080-2, since you may have missed more than one question in a certain subject matter code.

FAR 1	Definitions and Abbreviations	A24	Commercial Pilots
		A25	Airline Transport Pilots
A01	General Definitions	A26	Flight Instructors
A02	Abbreviations and Symbols	A27	Appendix A: Practical Test Requirements for Airline Transport Pilot Certificates and Associated Class and Type Ratings
FAR 23	Airworthiness Standards: Normal, Utility, and Acrobatic Category Aircraft	A28	Appendix B: Practical Test Requirements for Rotorcraft Airline Transport Pilot Certificates with a Helicopter Class Rating and Associated Type Ratings
A10	General	A29	Recreational Pilot
FAR 25	Airworthiness Standards: Transport Category Airplanes	FAR 63	Certification: Flight Crewmembers Other Than Pilots
A03	General	A30	General
A04	Flight	A31	Flight Engineers
A05	Structure	A32	Flight Navigators
A06	Design and Construction	FAR 65	Certification: Airmen Other Than Flight Crewmembers
A07	Powerplant		
A08	Equipment		
A09	Operating Limitations and Information		
FAR 43	Maintenance, Preventive Maintenance, Rebuilding, and Alteration	A40	General
		A41	Aircraft Dispatchers
A15	General	FAR 71	Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points
A16	Appendixes		
FAR 61	Certification: Pilots and Flight Instructors	A60	General
		A61	Airport Radar Service Areas
A20	General	A64	Control Areas and Extensions
A21	Aircraft Ratings and Special Certificates		
A22	Student Pilots		
A23	Private Pilots		

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FAR 91	General Operating Rules	D06	Aircraft Requirements
		D09	Airplane Performance Operating Limitations
B07	General	D10	Special Airworthiness Requirements
B08	Flight Rules - General	D11	Instrument and Equipment Requirements
B09	Visual Flight Rules	D12	Maintenance, Preventive Maintenance, and Alterations
B10	Instrument Flight Rules		
B11	Equipment, Instrument, and Certification Requirements	D13	Airman and Crewmember Requirements
		D14	Training Program
B12	Special Flight Operations	D15	Crewmember Qualifications
B13	Maintenance, Preventive Maintenance, and Alterations	D16	Aircraft Dispatcher Qualifications and Duty Time Limitations: Domestic and Flag Air Carriers
B14	Large and Turbine-powered Multiengine Airplanes	D17	Flight Time Limitations and Rest Requirements: Domestic Air Carriers
B15	Additional Equipment and Operating Requirements for Large and Transport Category Aircraft	D18	Flight Time Limitations: Flag Air Carriers
		D19	Flight Time Limitations: Supplemental Air Carriers and Commercial Operators
B16	Appendix A - Category II Operations: Manual, Instruments, Equipment, and Maintenance	D20	Flight Operations
		D21	Dispatching and Flight Release Rules
		D22	Records and Reports
FAR 97	Standard Instrument Approach Procedures	D23	Crewmember Certificate: International
		D24	Special Federal Aviation Regulation SFAR No. 14
B97	General		
FAR 108	Airplane Operator Security	FAR 125	Certification and Operations: Airplanes Having a Seating Capacity of 20 or More Passengers or a Maximum Payload Capacity of 6,000 Pounds or More
C10	General		
FAR 121	Certification and Operations: Domestic, Flag and Supplemental Air Carriers and Commercial Operators of Large Aircraft	D30	General
		D31	Certification Rules and Miscellaneous Requirements
		D32	Manual Requirements
		D33	Airplane Requirements
D01	General	D34	Special Airworthiness Requirements
D02	Certification Rules for Domestic and Flag Air Carriers	D35	Instrument and Equipment Requirements
D03	Certification Rules for Supplemental Air Carriers and Commercial Operators	D36	Maintenance
D04	Rules Governing all Certificate Holders Under This Part	D37	Airman and Crewmember Requirements
D05	Approval of Routes: Domestic and Flag Air Carriers	D38	Flight Crewmember Requirements
		D39	Flight Operations
D06	Approval of Areas and Routes for Supplemental Air Carriers and Commercial Operators	D40	Flight Release Rules
D07	Manual Requirements	D41	Records and Reports

FAR 135	Air Taxi Operators and Commercial Operators	G12	Preservation of Aircraft Wreckage, Mail, Cargo, and Records
		G13	Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft
E01	General		
E02	Flight Operations		
E03	Aircraft and Equipment		
E04	VFR/IFR Operating Limitations and Weather Requirements	AC 61-23	Pilot's Handbook of Aeronautical Knowledge
E05	Flight Crewmember Requirements	H01	Principles of Flight
E06	Flight Crewmember Flight Time Limitations and Rest Requirements	H02	Airplanes and Engines
E07	Crewmember Testing Requirements	H03	Flight Instruments
E08	Training	H04	Airplane Performance
E09	Airplane Performance Operating Limitations	H05	Weather
E10	Maintenance, Preventive Maintenance, and Alterations	H06	Basic Calculations Using Navigational Computers or Electronic Calculators
E11	Appendix A: Additional Airworthiness Standards for 10 or More Passenger Airplanes	H07	Navigation
		H09	Appendix 1: Obtaining FAA Publications
E12	Special Federal Aviation Regulations SFAR No. 36	AC 91-23	Pilot's Weight and Balance Handbook
E13	Special Federal Aviation Regulations SFAR No. 38	H10	Weight and Balance Control
		H11	Terms and Definitions
		H12	Empty Weight Center of Gravity
		H13	Index and Graphic Limits
		H14	Change of Weight
US HMR 172 Hazardous Materials Table		H15	Control of Loading — General Aviation
		H16	Control of Loading — Large Aircraft
F02	General		
US HMR 175 Materials Transportation Bureau Hazardous Materials Regulations (HMR)		AC 60-14	Aviation Instructor's Handbook
G01	General Information and Regulations	H20	The Learning Process
G02	Loading, Unloading, and Handling	H21	Human Behavior
G03	Specific Regulation Applicable According to Classification of Material	H22	Effective Communication
		H23	The Teaching Process
		H24	Teaching Methods
		H25	The Instructor as a Critic
		H26	Evaluation
		H27	Instructional Aids
NTSB 830	Rules Pertaining to the Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records	H30	Flight Instructor Characteristics and Responsibilities
G10	General	H31	Techniques of Flight Instruction
G11	Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft	H32	Planning Instructional Activity

Appendix 1

AC 61-21 Flight Training Handbook		Gyroplane Flight Training Manual — McCulloch	
H50	Introduction to Flight Training	H90	Gyroplane Systems
H51	Introduction to Airplanes and Engines	H91	Gyroplane Terms
H52	Introduction to the Basics of Flight	H92	Use of Flight Controls (Gyroplane)
H53	The Effect and Use of Controls	H93	Fundamental Maneuvers of Flight (Gyroplane)
H54	Ground Operations	H94	Basic Flight Maneuvers (Gyroplane)
H55	Basic Flight Maneuvers		
H56	Airport Traffic Patterns and Operations	AC 61-27 Instrument Flying Handbook	
H57	Takeoffs and Departure Climbs		
H58	Landing Approaches and Landings	I01	Training Considerations
H59	Faulty Approaches and Landings	I02	Instrument Flying: Coping with Illusions in Flight
H60	Proficiency Flight Maneuvers	I03	Aerodynamic Factors Related to Instrument Flying
H61	Cross-Country Flying	I04	Basic Flight Instruments
H62	Emergency Flight by Reference to Instruments	I05	Attitude Instrument Flying — Airplanes
H63	Night Flying	I06	Attitude Instrument Flying — Helicopters
H64	Seaplane Operations	I07	Electronic Aids to Instrument Flying
H65	Transition to Other Airplanes	I08	Using the Navigation Instruments
H66	Principles of Flight and Performance Characteristics	I09	Radio Communications Facilities and Equipment
		I10	The Federal Airways System and Controlled Airspace
AC 61-13 Basic Helicopter Handbook		I11	Air Traffic Control
H70	General Aerodynamics	I12	ATC Operations and Procedures
H71	Aerodynamics of Flight	I13	Flight Planning
H72	Loads and Load Factors	I14	Appendix: Instrument Instructor Lesson Guide — Airplanes
H73	Function of the Controls	I15	Segment of En Route Low Altitude Chart
H74	Other Helicopter Components and Their Functions		
H75	Introduction to the Helicopter Flight Manual	AC 00-6 Aviation Weather	
H76	Weight and Balance	I20	The Earth's Atmosphere
H77	Helicopter Performance	I21	Temperature
H78	Some Hazards of Helicopter Flight	I22	Atmospheric Pressure and Altimetry
H79	Precautionary Measures and Critical Conditions	I23	Wind
H80	Helicopter Flight Maneuvers	I24	Moisture, Cloud Formation, and Precipitation
H81	Confined Area, Pinnacle, and Ridgeline Operations	I25	Stable and Unstable Air
H82	Glossary	I26	Clouds
		I27	Air Masses and Fronts
		I28	Turbulence
		I29	Icing
		I30	Thunderstorms
		I31	Common IFR Producers
		I32	High Altitude Weather
		I33	Arctic Weather

I34	Tropical Weather	J21	Emergency Procedures — General
I35	Soaring Weather	J22	Emergency Services Available to Pilots
I36	Glossary of Weather Terms	J23	Distress and Urgency Procedures
AC 0045	Aviation Weather Services	J24	Two-Way Radio Communications Failure
I40	The Aviation Weather Service Program	J25	Meteorology
I41	Surface Aviation Weather Reports	J26	Altimeter Setting Procedures
I42	Pilot and Radar Reports and Satellite Pictures	J27	Wake Turbulence
I43	Aviation Weather Forecasts	J28	Bird Hazards, and Flight Over National Refuges, Parks, and Forests
I44	Surface Analysis Chart	J29	Potential Flight Hazards
I45	Weather Depiction Chart	J30	Safety, Accident, and Hazard Reports
I46	Radar Summary Chart	J31	Fitness for Flight
I47	Significant Weather Prognostics	J32	Type of Charts Available
I48	Winds and Temperatures Aloft	J33	Pilot Controller Glossary
I49	Composite Moisture Stability Chart	J34	Airport/Facility Directory
I50	Severe Weather Outlook Chart	J35	En Route Low Altitude Chart
I51	Constant Pressure Charts	J36	En Route High Altitude Chart
I52	Tropopause Data Chart	J37	Sectional Chart
I53	Tables and Conversion Graphs	J40	Standard Instrument Departure (SID) Chart
AIM	Airman's Information Manual	J41	Standard Terminal Arrival (STAR) Chart
J01	Air Navigation Radio Aids	J42	Instrument Approach Procedures
J02	Radar Services and Procedures	J43	Helicopter Route Chart
J03	Airport Lighting Aids	AC 67-2	Medical Handbook for Pilots
J04	Air Navigation and Obstruction Lighting	J52	Hypoxia
J05	Airport Marking Aids	J53	Hyperventilation
J06	Airspace — General	J55	The Ears
J07	Uncontrolled Airspace	J56	Alcohol
J08	Controlled Airspace	J57	Drugs and Flying
J09	Special Use Airspace	J58	Carbon Monoxide
J10	Other Airspace Areas	J59	Vision
J11	Service Available to Pilots	J60	Night Flight
J12	Radio Communications Phraseology and Techniques	J61	Cockpit Lighting
J13	Airport Operations	J62	Disorientation (Vertigo)
J14	ATC Clearance/Separations	J63	Motion Sickness
J15	Preflight	J64	Fatigue
J16	Departure Procedures	J65	Noise
J17	En Route Procedures	J66	Age
J18	Arrival Procedures	J67	Some Psychological Aspects of Flying
J19	Pilot/Controller Roles and Responsibilities	J68	The Flying Passenger
J20	National Security and Interception Procedures		

Appendix 1

ADDITIONAL ADVISORY CIRCULARS

K01	AC 00-24, Thunderstorms
K02	AC 00-30, Rules of Thumb for Avoiding or Minimizing Encounters with Clear Air Turbulence
K03	AC 00-34, Aircraft Ground Handling and Servicing
K04	AC 00-54, Pilot Wind Shear Guide
K11	AC 20-34D , Prevention of Retractable Landing Gear Failure
K12	AC 20-32, Carbon Monoxide (CO) Contamination in Aircraft — Detection and Prevention
K13	AC 20-43, Aircraft Fuel Control
K20	AC 20-103, Aircraft Engine Crankshaft Failure
L10	AC 61-92, Use of Distractions During Pilot Certification Flight Tests
L34	AC 90-48, Pilots' Role in Collision Avoidance
L42	AC 90-87, Helicopter Dynamic Rollover
L50	AC 91-6, Water, Slush, and Snow on the Runway
L51	AC 91-8 , Use of Oxygen by Aviation Pilots/Passengers
L52	AC 91-13, Cold Weather Operation of Aircraft
L53	AC 91-14, Altimeter Setting Sources
L57	AC 91-43, Unreliable Airspeed Indications
L59	AC 91-46, Gyroscopic Instruments — Good Operating Practices
L61	AC 91-50 , Importance of Transponder Operation and Altitude Reporting
L62	AC 91-51, Airplane Deice and Anti-Ice Systems
L80	AC 103-4, Hazard Associated with Sublimation of Solid Carbon Dioxide (Dry Ice) Aboard Aircraft (This AC is not listed as a current document)
M01	AC 120-12, Private Carriage Versus Common Carriage of Persons or Property
M02	AC 120-27, Aircraft Weight and Balance Control

M13	AC 121-195, Alternate Operational Landing Distances for Wet Runways; Turbojet Powered Transport Category Airplanes
M51	AC 20-17, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing
M52	AC 00-2, Advisory Circular Checklist

American Soaring Handbook — Soaring Society of America

N01	A History of American Soaring
N02	Training
N03	Ground Launch
N04	Airplane Tow
N05	Meteorology
N06	Cross-Country and Wave Soaring
N07	Instruments and Oxygen
N08	Radio, Rope, and Wire
N09	Aerodynamics
N10	Maintenance and Repair

Soaring Flight Manual — Jeppesen-Sanderson, Inc.

N20	Sailplane Aerodynamics
N21	Performance Considerations
N22	Flight Instruments
N23	Weather for Soaring
N24	Medical Factors
N25	Flight Publications and Airspace
N26	Aeronautical Charts and Navigation
N27	Computations for Soaring
N28	Personal Equipment
N29	Preflight and Ground Operations
N30	Aerotow Launch Procedures
N31	Ground Launch Procedures
N32	Basic Flight Maneuvers and Traffic
N33	Soaring Techniques
N34	Cross-Country Soaring

Taming The Gentle Giant — Taylor Publishing

001	Design and Construction of Balloons
002	Fuel Source and Supply
003	Weight and Temperature

004	Flight Instruments	R10	Required Thrust and Power
005	Balloon Flight Tips	R11	Available Thrust and Power
006	Glossary	R12	Items of Airplane Performance
Balloon Federation Of America — Flight Instructor Manual		R21	General Concepts and Supersonic Flow Patterns
010	Flight Instruction Aids	R22	Configuration Effects
011	Human Behavior and Pilot Proficiency	R31	Definitions
012	The Flight Check and the Designated Examiner	R32	Longitudinal Stability and Control
Balloon Federation of America — Propane Systems		R33	Directional Stability and Control
020	Propane Glossary	R34	Lateral Stability and Control
021	Chemical and Physical Systems	R35	Miscellaneous Stability Problems
022	Cylinders	R40	General Definitions and Structural Requirements
023	Lines and Fittings	R41	Aircraft Loads and Operating Limitations
024	Valves	R50	Application of Aerodynamics to Specific Problems of Flying
025	Regulators	AC 65-9A Airframe and Powerplant Mechanics General Handbook	
026	Burners	so1	Mathematics
027	Propane Systems — Schematics	so2	Aircraft Drawings
028	Propane References	so3	Aircraft Weight and Balance
Balloon Federation of America — Powerline Excerpts		so4	Fuels and Fuel Systems
030	Excerpts	so5	Fluid Lines and Fittings
Goodyear Airship Operations Manual		S06	Aircraft Hardware, Materials, and Processes
P01	Buoyancy	so7	Physics
P02	Aerodynamics	S08	Basic Electricity
P03	Free Ballooning	so9	Aircraft Generators and Motors
P04	Aerostatics	S10	Inspection Fundamentals
P05	Envelope	S11	Ground Handling, Safety, and Support Equipment
P06	Car	AC 65-12A Airframe and Powerplant Mechanics Powerplant Handbook	
P07	Powerplant	S12	Theory and Construction of Aircraft Engines
P08	Airship Ground Handling	S13	Induction and Exhaust Systems
P09	Operating Instructions	s14	Engine Fuel and Metering Systems
P10	History	S15	Engine Ignition and Electrical Systems
Aerodynamics For Naval Aviators, NAVWEPS 00-80T-80		S16	Engine Starting Systems
R01	Wing and Airfoil Forces	S17	Lubrication. and Cooling Systems
R02	Planform Effects and Airplane Drag	S18	Propellers
		S19	Engine Fire Protection Systems
		S20	Engine Maintenance and Operation

Appendix 1

AC 65-15A	Airframe and Powerplant Mechanics Airframe Handbook	S50	Powerplant Electrical Systems
		s51	Powerplant Electrical Installation
		S52	Powerplant Instrument Systems
S21	Aircraft Structures	s53	Fire Protection Systems
s22	Assembly and Rigging	s54	Aircraft Fuel Metering Systems
S23	Aircraft Structural Repairs	s55	Engine Induction Systems
S24	Ice and Rain Protection	S56	Engine Cooling Systems
S25	Hydraulic and Pneumatic Power Systems	s57	Engine Exhaust Systems
S26	Landing Gear Systems	S58	Engine Starting Systems
S27	Fire Protection Systems	s59	Engine Lubrication Systems
S28	Aircraft Electrical Systems	S60	Propellers
s29	Aircraft Instrument Systems	EA-ITP-AB	Aviation Technician Integrated Training Program Airframe Section Textbook — IAP, Inc.
S30	Communications and Navigation Systems		
S31	Cabin Atmosphere Control Systems	S61	Aircraft Structures
EA-ITP-GB	Aviation Technician Integrated Training Program General Section Textbook — International Aviation Publishers (IAP), Inc.	S62	Sheet Metal Structural Repair
		S63	Aircraft Fabric Covering
S32	Mathematics and Physics	S64	Aircraft Assembly and Rigging
s33	Basic Electricity - DC	S65	Aircraft Electrical Systems
s34	Basic Electricity - AC	S66	Aircraft Hydraulic and Pneumatic Power Systems
s35	Aircraft Drawings	S67	Aircraft Cabin Atmosphere Control Systems
S36	Weight and Balance	S68	Aircraft Instrument Systems
s37	Fluid Lines and Fittings	S69	Aircraft Fuel Systems
S38	Aircraft Hardware	EA-TEP-2	Aircraft Gas Turbine Powerplants — IAP, Inc.
s39	Aircraft Structure Materials		
S40	Corrosion and Its Control	S70	History of Turbine Engine Development
s41	Ground Handling and Servicing	s71	Jet Propulsion Theory
S42	Maintenance Publications	S72	Turbine Engine Design and Construction
S43	Federal Aviation Regulations	S73	Engine Familiarization
S44	Maintenance Forms and Records	s74	Inspection and Maintenance
EA-ITP-P	Aviation Technician Integrated Training Program Powerplant Section Textbook — IAP, Inc.	s75	Lubrication Systems
		S76	Fuel Systems
s45	Reciprocating Engine Theory	s77	Compressor Anti-Stall Systems
S46	Reciprocating Engine Maintenance and Operation	S78	Anti-Icing Systems
s47	Turbine Engine Theory	s79	Starter Systems
S48	Turbine Engine Maintenance and Operation	S80	Ignition Systems
s49	Engine ignition Systems	S81	Engine Instrument Systems
		S82	Fire/Overheat Detection and Extinguishing Systems for Turbine Engines
		S83	Engine Operation

EA-APC Aircraft Propellers and Controls — IAP, Inc.

S84	Introduction to Propellers
S85	FAR's and Propellers
S86	Propeller Theory
S87	Fixed-Pitch Propellers and Propeller Blades
S88	Propeller Installations
S89	Reversing Propeller Systems
S90	Propeller Auxiliary Systems

EA-BAL Aircraft Weight and Balance — IAP, Inc.

S91	Theory of Weight and Balance
S92	Data Investigation
s93	Weighing the Aircraft
s94	Aircraft Loading

The Aircraft Gas Turbine Engine and Its Operation — United Technologies Corporation, Pratt Whitney

T01	Gas Turbine Engine Fundamentals
T02	Gas Turbine Engine Terms
T03	Gas Turbine Engine Components
T04	Gas Turbine Engine Operation
T05	Operational Characteristics of Jet Engines
T06	Gas Turbine Engine Performance

Aircraft Powerplants — McGraw-Hill

T07	Aircraft Powerplant Classification and Progress
T08	Reciprocating-Engine Construction and Nomenclature
T09	Internal-Combustion Engine Theory and Performance
T10	Lubricants and Lubricating Systems
T11	Induction Systems, Superchargers, Turbochargers, and Exhaust Systems
T12	Basic Fuel Systems and Carburetors
T13	Fuel Injection Systems
T14	Reciprocating-Engine Ignition and Starting Systems
T15	Operation, Inspection, Maintenance, and

T16	Troubleshooting of Reciprocating Engines
T17	Reciprocating-Engine Overhaul Practices
T18	Gas Turbine Engine: Theory, Construction, and Nomenclature
T19	Gas Turbine Engine: Fuels and Fuel Systems
T20	Turbine-Engine Lubricants and Lubricating Systems
T21	Ignition and Starting Systems of Gas-Turbine Engines
T22	Turbofan Engines
T23	Turboprop Engines
T24	Turboshaft Engines
T25	Gas-Turbine Operation, Inspection, Troubleshooting, Maintenance, and Overhaul
T26	Propeller Theory, Nomenclature, and Operation
T27	Turbopropellers and Control Systems
T28	Propeller Installation, Inspection, and Maintenance
T29	Engine Control System
	Engine Indicating and Warning Systems

EA-ATDQ Aircraft Technical Dictionary — IAP, Inc.

T30	Definitions
-----	-------------

Aircraft Basic Science — McGraw-Hill

T31	Fundamentals of Mathematics
T32	Science Fundamentals
T33	Basic Aerodynamics
T34	Airfoils and their Applications
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T46	Aircraft Hydraulic and Pneumatic Systems
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T50	Aircraft Instruments and Instrument Systems
T51	Auxiliary Systems
T52	Assembly and Rigging

EA-363 Transport Category Aircraft Systems — IAP, Inc.

T53	Types, Design Features and Configurations of Transport Aircraft
T54	Auxiliary Power Units, Pneumatic, and Environmental Control Systems
T55	Anti-icing Systems and Rain Protection
T56	Electrical Power Systems
T57	Flight Control Systems
T58	Fuel Systems
T59	Hydraulic Systems
T60	Oxygen Systems
T61	Warning and Fire Protection Systems
T62	Communications, Instruments, and Navigational Systems
T63	Miscellaneous Aircraft Systems and Maintenance Information

Aircraft Electricity and Electronics — McGraw-Hill

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T65	Magnetism and Electromagnetism
T66	Capacitors and Inductors
T67	Alternating Current
T68	Electric Measuring Instruments
T69	Batteries
T70	Generator Theory
T71	DC Generators, Controls, and Systems
T72	AC Generators, Controls, and Systems
T73	Electric Motors
T74	Installation and Maintenance of Electrical Systems
T75	Principles of Electronics

T76	Radio Transmitters and Receivers
T77	Electric Instruments
I-78	Electronic Control Systems
T79	Weather Warning Systems
T80	Communication and Navigation Systems
T81	Automatic Pilots and Landing Systems

FAA Accident Prevention Program Bulletins

V01	FAA-P-8740-2, Density Altitude
vo2	FAA-P-8740-5, Weight and Balance
vo3	FAA-P-8740-12, Thunderstorms
vo4	FAA-P-8740-19, Flying Light Twins Safely
vo5	FAA-P-8740-23, Planning your Takeoff
V06	FAA-P-8740-24, Tips on Winter Flying
V07	FAA-P-8740-25, Always Leave Yourself an out
V08	FAA-P-8740-30, How to Obtain a Good Weather Briefing
V09	FAA-P-8740-40, Wind Shear
V10	FAA-P-8740-41, Medical Facts for Pilots
V11	FAA-P-8740-44, Impossible Turns
v12	FAA-P-8740-48, On Landings, Part I
v13	FAA-P-8740-49, On Landings, Part II
v14	FAA-P-8740-50, On Landings, Part III
v15	FAA-P-8740-51, How to Avoid a Midair Collision
V16	FAA-P-8740-52, The Silent Emergency

EA-338 Flight Theory for Pilots — IAP, Inc.

W01	Introduction
wo2	Air Flow and Airspeed Measurement
wo3	Aerodynamic Forces on Airfoils
wo4	Lift and Stall
wo5	Drag
W06	Jet Aircraft Basic Performance
wo7	Jet Aircraft Applied Performance
W08	Prop Aircraft Basic Performance
W09	Prop Aircraft Applied Performance
W10	Helicopter Aerodynamics
W11	Hazards of Low Speed Flight
w12	Takeoff Performance
w13	Landing Performance
w14	Maneuvering Performance
w15	Longitudinal Stability and Control

W16 Directional and Lateral Stability and
Control
w17 High Speed Flight

NOTE: AC 00-2, Advisory Circular Checklist, transmits the status of all FAA advisory circulars (AC's), as well as FAA internal publications and miscellaneous flight information such as AIM, Airport/Facility Directory, written test question books, practical test standards, and other material directly related to a certificate or rating. To obtain a free copy of the AC 00-2, send your request to:

U.S. Department of Transportation
Utilization and Storage Section, M-443.2
Washington, DC 20590

APPENDIX 2

GROUND REFERENCE			
LESSON	MANEUVERS	STUDENT	D A T E
A	_____	<ul style="list-style-type: none"> TO DEVELOP THE STUDENT'S SKILL IN PLANNING AND FOLLOWING A PATTERN OVER THE GROUND COMPENSATING FOR WIND DRIFT AT VARYING ANGLES. 	
B	_____	<ul style="list-style-type: none"> USE OF GROUND REFERENCES TO CONTROL PATH. OBSERVATION AND CONTROL OF WIND EFFECT. CONTROL OF AIRPLANE ATTITUDE, ALTITUDE, AND HEADING. 	
C	_____	<ul style="list-style-type: none"> PREFLIGHT DISCUSSION. : 10 INSTRUCTOR DEMONSTRATIONS. : 25 STUDENT PRACTICE. : 45 POSTFLIGHT CRITIQUE. : 10 	
D	_____	<ul style="list-style-type: none"> CHALKBOARD FOR PREFLIGHT DISCUSSION. IFR VISOR FOR MANEUVERS REVIEWED. 	
E	_____	<ul style="list-style-type: none"> PREFLIGHT – DISCUSS LESSON OBJECTIVE. DIAGRAM RECTANGULAR COURSE, S-TURNS ACROSS A ROAD, AND TURNS AROUND A POINT ON CHALKBOARD. INFLIGHT – DEMONSTRATE ELEMENTS. DEMONSTRATE RECTANGULAR COURSE, S-TURNS ACROSS A ROAD, AND TURNS AROUND A POINT. COACH STUDENT PRACTICE. POSTFLIGHT- CRITIQUE STUDENT PERFORMANCE AND MAKE STUDY ASSIGNMENT. 	
F	_____	<ul style="list-style-type: none"> PREFLIGHT – DISCUSS LESSON OBJECTIVE AND RESOLVE QUESTIONS. INFLIGHT – REVIEW PREVIOUS MANEUVERS INCLUDING POWER-OFF STALLS AND SLOW FLIGHT. PERFORM EACH NEW MANEUVER AS DIRECTED. POSTFLIGHT -ASK PERTINENT QUESTIONS. 	
G	_____	<ul style="list-style-type: none"> STUDENT SHOULD DEMONSTRATE COMPETENCY IN MAINTAINING ORIENTATION, AIRSPEED WITHIN 10 KNOTS, ALTITUDE WITHIN 100 FEET, AND HEADINGS WITHIN 10 DEGREES, AND IN MAKING PROPER CORRECTION FOR WIND DRIFT. 	

FIGURE 1.—Lesson Plan.

Appendix 2

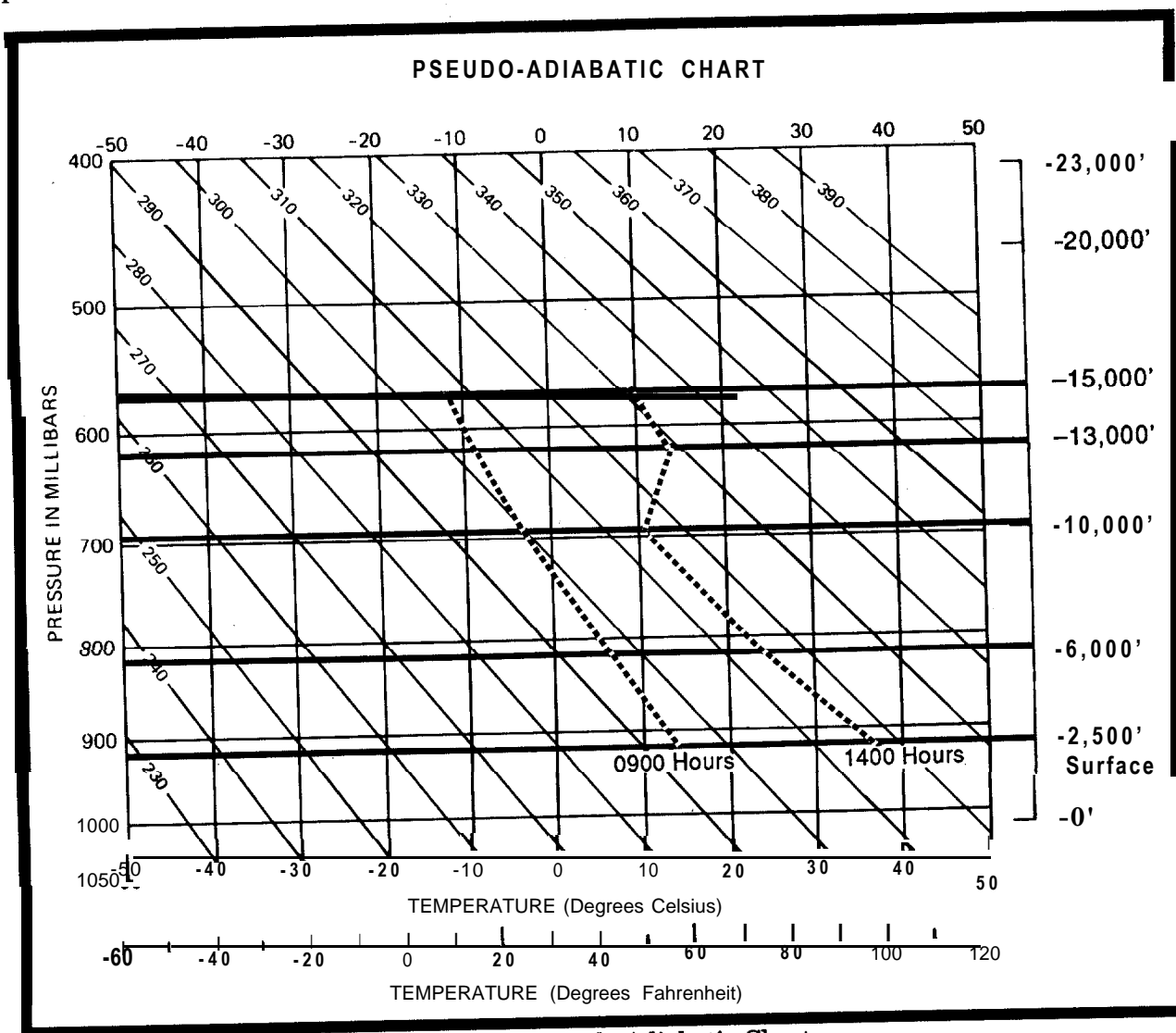


FIGURE 2. Pseudo-Adiabatic Chart.

SELECTED SURFACE AVIATION WEATHER REPORTS

SA 301701
 FTW SA 1654 -X M6 OVC 11/2HK 69/63/0904/010/ F2 TWR VSBY 21/2 CIG RGD
 DFW SA 1646 M8 OVC 4F 193/68/64/1105/0111
 DAL SA 1649 M9 OVC 4FH 72/63/0000/010
 TYR SA 1650 -X 15 SCT 3F 76/66/0804/999/F2
 ABI SA 1651 30 SCT E200 OVC 25 168/74/51/1614/008 CB W-N
 AMA SA 1651 M5 OVC 4F 217/51/48/0516/023/LB26E40
 AUS RS 1651 M10 BKN 24 BKN 160 OVC 4R-H 169/70/63/1208/005/RB25
 BKO SA 1655 20 SCT 130 SCT E250 OVC 7 149/85/67/1515G20/997/RB19E25
 TCU ALQDS

FIGURE 3.—Surface Aviation Weather Reports.

PILOT REPORTS

UA /OV DAL 090015 1725 FL090 /TP BE55 /SK 045 OVC 085 CLR ABV
 UA /OV ABI 270015 1845 FL120 /TP C411/TB MDT BLO-100
 UA /OV AUS 315020 1715 FL150 /TP C500 /SK OVC 130 /IC TRACE RIME
 DURGC WBND 090-130
 UA /OV BRO 360030 1700 FL045 /TP PA31 /SK 050 OVC /RM LRG TSTM
 50N BRO 20 WIDE

FIGURE 4.—Pilot Reports.

SELECTED TERMINAL FORECASTS

FT 300940
 ABI 301010 C250 BKN 1413.122 20 SCT CI00 BKN 1615 CHC CI4 OVC 1TRW. 18Z 30 SCT
 CI00 BKN 1716 CHC CI0 OVC 1TRW. 02Z 80 SCT C250 BKN 04Z VFR . .
 ACT 301010 CI X 1/2F VRBL C7 BKN 3F. 17Z C20 BKN CHC C12 OVC 2TRW. 04Z VFR CIG
 ABV 10 THSD BCMG IFR CIG TRWF . .
 AMA 301010 C8 OVC 3R-F 0314 CHC C5 OVC 1TRW-F. 17Z CI8 BKN 0418 CHC C8 OVC 1 TRWF.
 20Z C30 BKN 1417 CHC CI0 OVC 1TRW+F. 04Z MVFR CIG . .
 AUS 301010 C5 OVC 2F. 14Z C14 OVC 1510 CHC TRW. 20Z C20 OVC 1510 CHC C5 OVC 2TRW
 G25. 02Z C12 OVC 1010 CHC TRW. 04Z MVFR CIG TRW. .
 BRO 301010 40 SCT CI50 OVC 1210. 14Z C30 BKN 1512 CHC RW/TRW. 02Z CI2 OVC 1010
 CHC RW/TRW. 04Z MVFR CIG TRW. .
 DAL 301010 80 SCT C250 4F VRBL C4 OVC 1F. 16Z CI8 BKN 0512 SLGT CHC CI2 OVC 2TRWF.
 19Z 30 SCT C80 BKN 0612 SCT CHC CI0 OVC 1TRWF. 04Z VFR . .

FIGURE CL—Terminal Forecasts.

Appendix 2

AREA FORECAST EXCERPT

DFWC FA 231040

SGFNT CLOUD AND **WX** VALID UNTIL ~~232300~~...OTLK 232300-240500

IFR...OK TX AR LA TN MS AL

FROM YDR TO YQT TO **YYZ** TO FWA TO CHA TO 60SE MSY TO LCH TO TXK
TO LBB TO SLN TO ISN TO YDR

OCNL **CIGS** BLO 10 OVC AND VSBYS BLO 3SF NRN AND WRN PTN AND RF
ELSW. CONDS SLOLY DMSHG FROM SW BUT CONTG BYD 232.

OK

CIGS ~~10-15~~ OVC LYRD TO 120. **OCNL CIGS** BLO 10 OVC AND VSBYS BLO
~~3R-S-F~~ **19Z CIGS** 20 BKN-OVC 80 BKN 120.222 AGL 20-30 SCT-BKN 60.
OTLK...VFR.

NWRN TX

CIGS 20-30 BKN 80. **OCNL CIGS** BLO 10 TIL 16Z ERN PNHDL.
18Z AGL 30-50 SCT. OTLK...VFR.

SWRN TX

NO **CIGS** BLO 120. OTLK...VFR.

NCNTRL AND NERN TX

AGL 15-20 SCT-BKN 50 BKN-OVC 120. **ISOLD** RW-. **18Z** AGL 20-30 SCT
80 BKN 120. OTLK...VFR.

SCNTRL TX **SERN** TX AND **CSTL** WTRS

CSTL PLAIN **SERN** AND **CSTL** WTRS..**CIGS** 15-20 BKN-OVC 40 OVC 15. SCT
TRW **WITH** CB TOPS 450 EXTRM **SERN** AND **CSTL** WTRS TIL **15Z**. 16Z **CIGS**
~~30~~ BKN-SCT 80 BKN **120**. OTLK...VFR.

RMNDR **SCNTRL** TX..**CIGS** 30-50 BKN 80 BKN 121. 16Z 80 BKN 120.
OTLK...VFR.

AR LA AND **CSTL** WTRS

CIGS 10-15 OVC LYJD TO 180. **OCNL CIGS** BLO 10 OVC AND VSBYS BLO
~~3R-F~~. SCT TRW WITH CB TOPS 450 SLOLY ENDG FROM W. 18Z **CIGS** 20 BKN
60 BKN-OVC 120. **ISOLD** TRW- WITH CB TOPS 350 **SERN** LA. **21Z** AGL
30-50 SCT 80 BKN 120 LA AND **CIGS** 20-30 **BKN-SCT** 80 BKN 120 AR.
OTLK...VFR.

WRN Two **THIRDS** TN MS AND **CSTL** WTRS

CIGS 10-15 OVC LYRD TO 150. **OCNL CIGS** BLO 10 OVC AND VSBYS BLO
~~3R-F~~. SCT TRW WITH CB TOPS 450. OTLK...**MVFR** CIG RW.

ERN THIRD IN

AGL 20 **SCT** 30-50 BKN-ovc **LYRD** TO **120**. **15Z** **CIGS** 20-30 BKN 50 ovc
LYRD TO 150. WDLY SCT TRW WITH CB TOPS 450. OTLK...**MVFR** CIG TRW.

AL

NWRN HALF..**CIGS** 10 OVC LYRD TO 150. WDLY SCT RW- WITH **OCNL CIGS**
BLO 10 OVC AND VSBYS BLO ~~3R-F~~ TIL **17Z**. WDLY SCT TRW WITH CB TOPS
450 AFT **13Z**. OTLK...**MVFR** CIG TRW.

SERN HALF AND **CSTL** WTRS..**CIGS** 15-20 BKN-OVC LYRD TO 150 WITH
WDLY SCT RW- **SWRN** PIN. LCL **CIGS** BLO 10 OVC AND VSBYS BLO ~~3R-F~~ TIL
16Z. WDLY SCT TRW- WITH CB TOPS 450 AFT **16Z**. OTLK...**MVFR** CIG TRW.

...

FIGURE 6.-Area Forecast.

WINDS AND TEMPERATURES ALOFT FORECASTS

FDUS1KWBC 301640
DATA BASED ON 301200Z

VALID 301800Z FOR USE 1700-2100Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
ABI		1409+11	1611+06	1609+01	1608-13	1815-25	192440	192550	191960
ABQ			1307+08	1608+01	2005-13	2508-26	271642	282151	292460
AMA		0408	0905+05	9900+00	2108-13	2214-25	232141	232351	232261
BRO	9900	2211+14	2314+09	2318+04	2428-10	2336-23	234739	235448	246358
DAL	1008	1506+11	1705+07	2006+01	2210-13	2217-24	222740	223049	232960
ICT	3514	3412+06	3210+03	2910-01	2618-13	2526-26	253542	254052	254463

FIGURE 7.—Winds and Temperatures Aloft Forecasts.

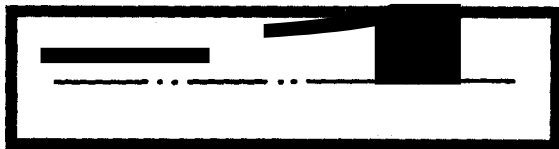


FIGURE 8.—Surface Analysis Chart Symbol.

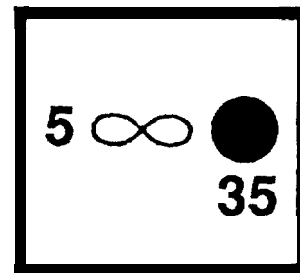


FIGURE 10.—Weather Depiction Chart Symbol.

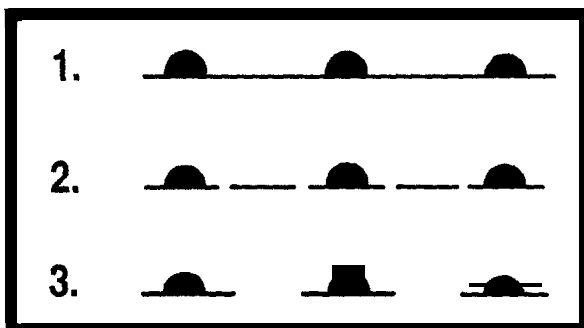


FIGURE 9.—Surface Analysis Chart Symbols.

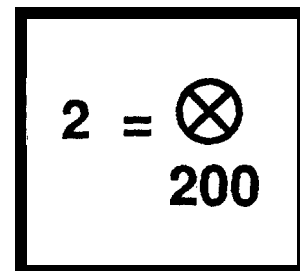


FIGURE 11.—Weather Depiction Chart Symbol.

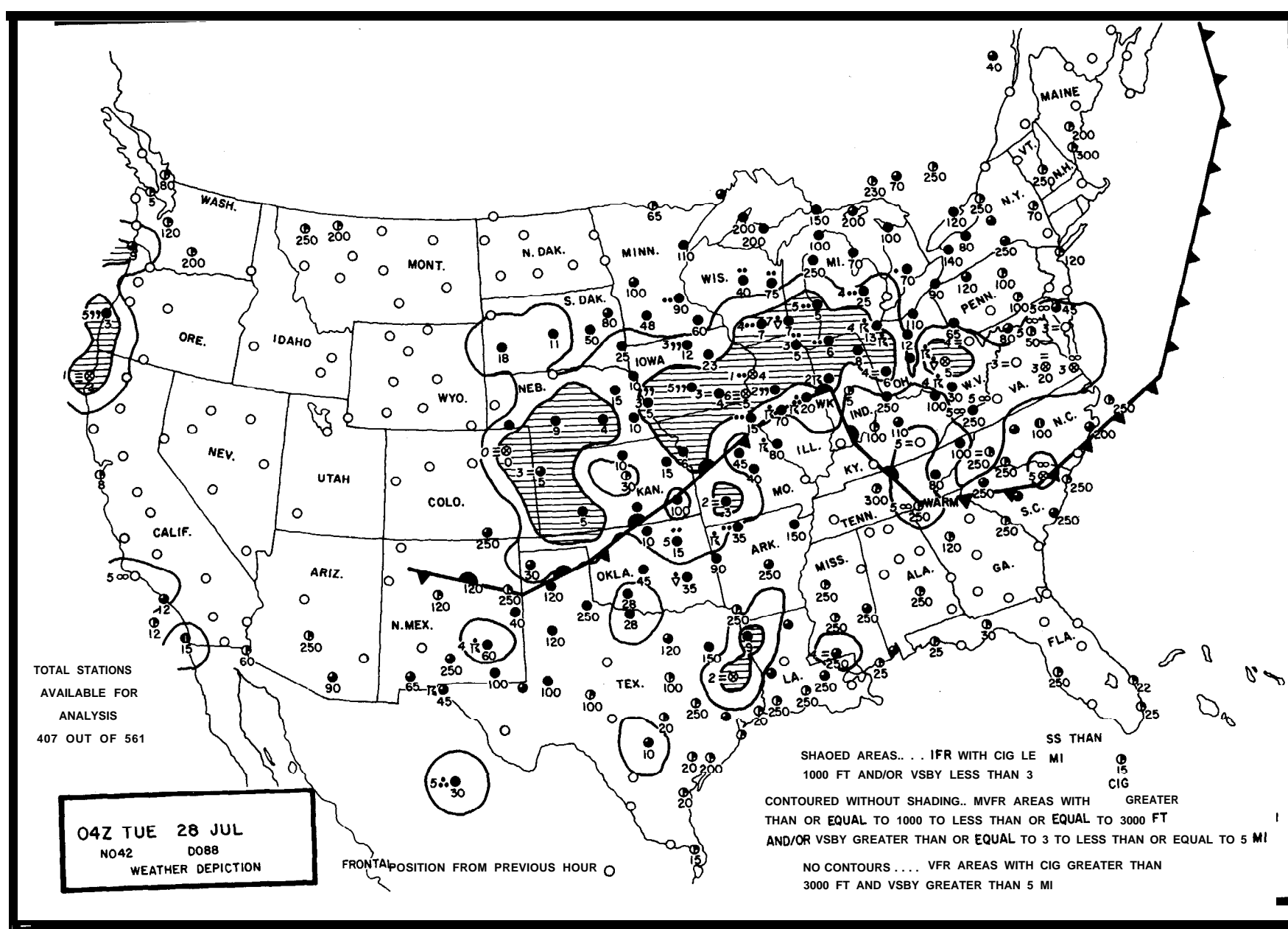
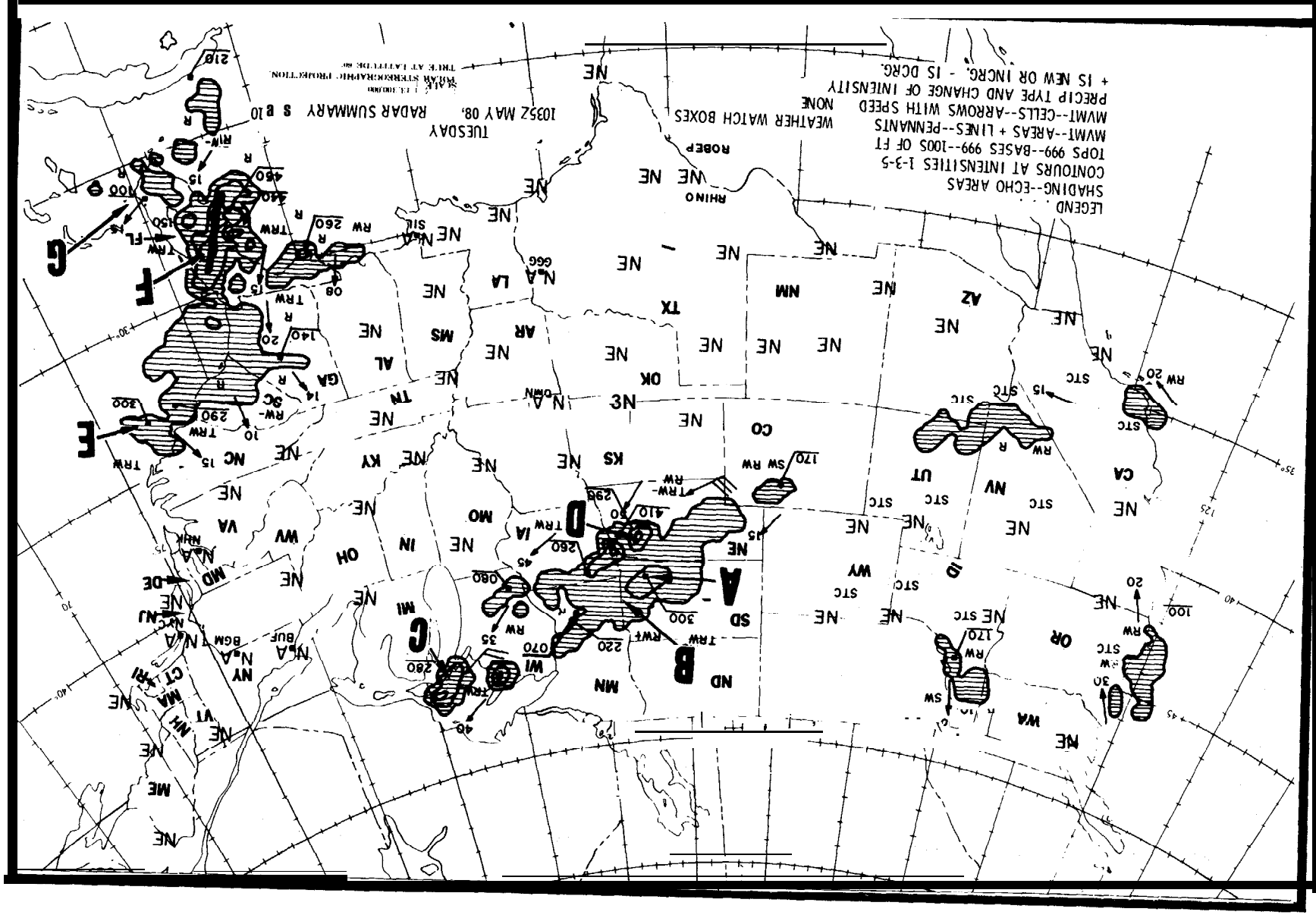


FIGURE 12.—Weather Depiction Chart.

FIGURE 13.—Radar Summary Chart.



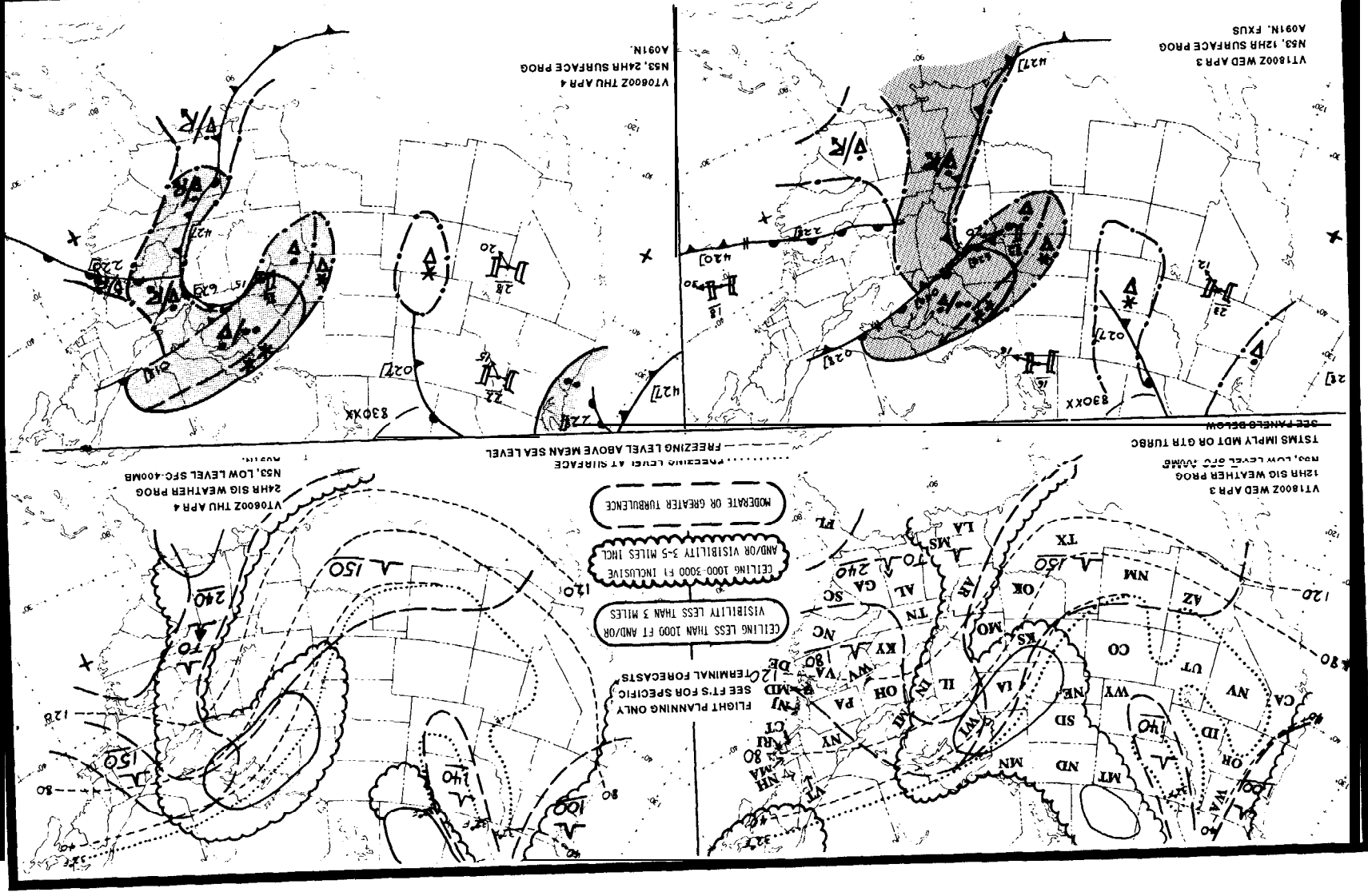


FIGURE 14.—Significant Weather Prognostic Chart.

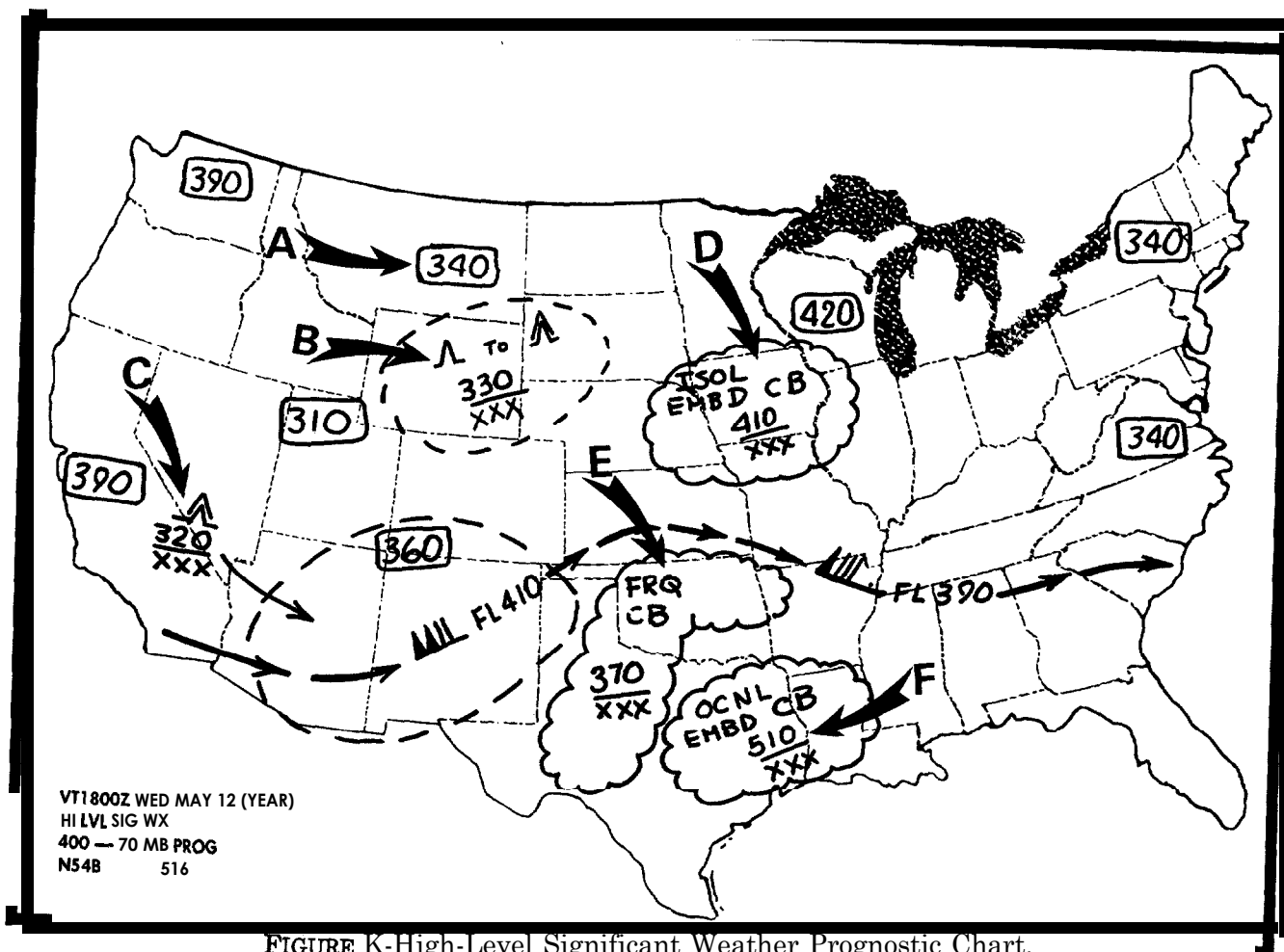


FIGURE K-High-Level Significant Weather Prognostic Chart.

Appendix 2

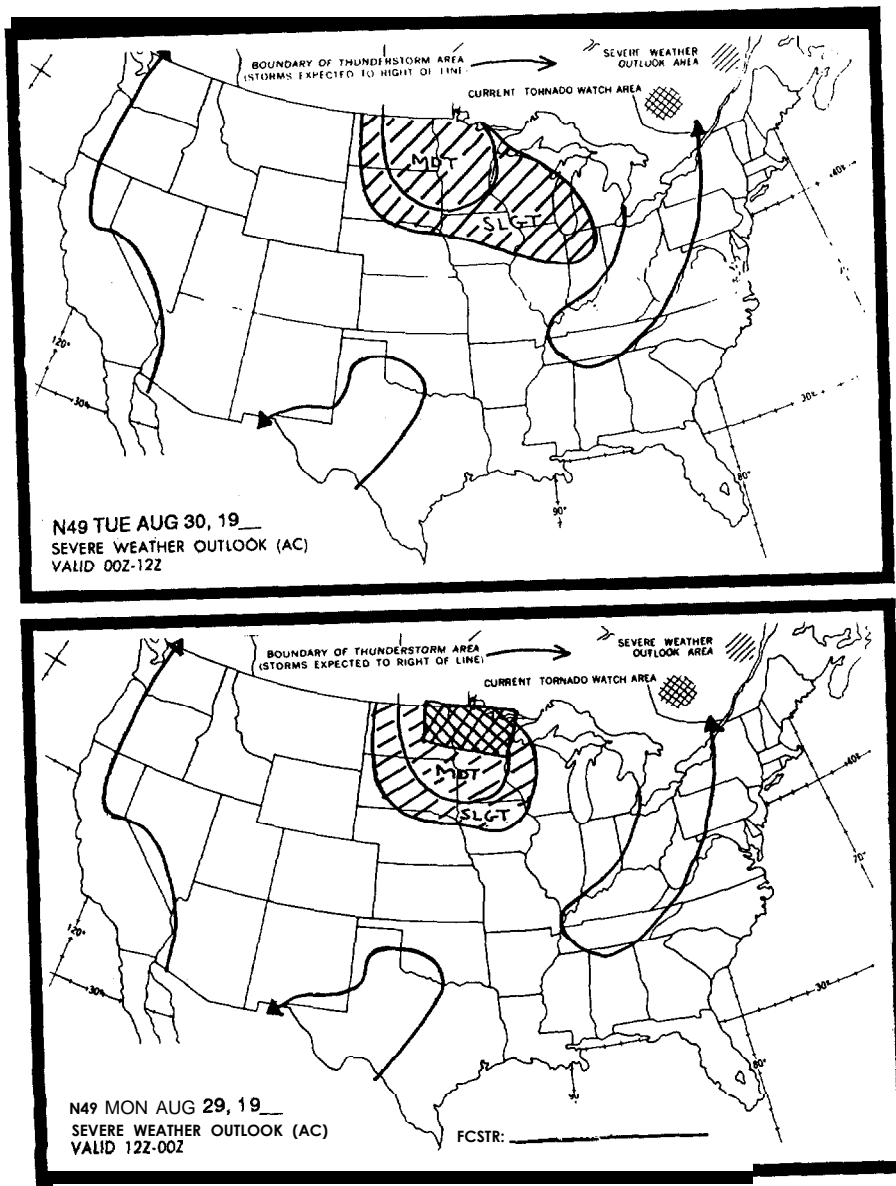


FIGURE 16.—Severe Weather Outlook Chart.

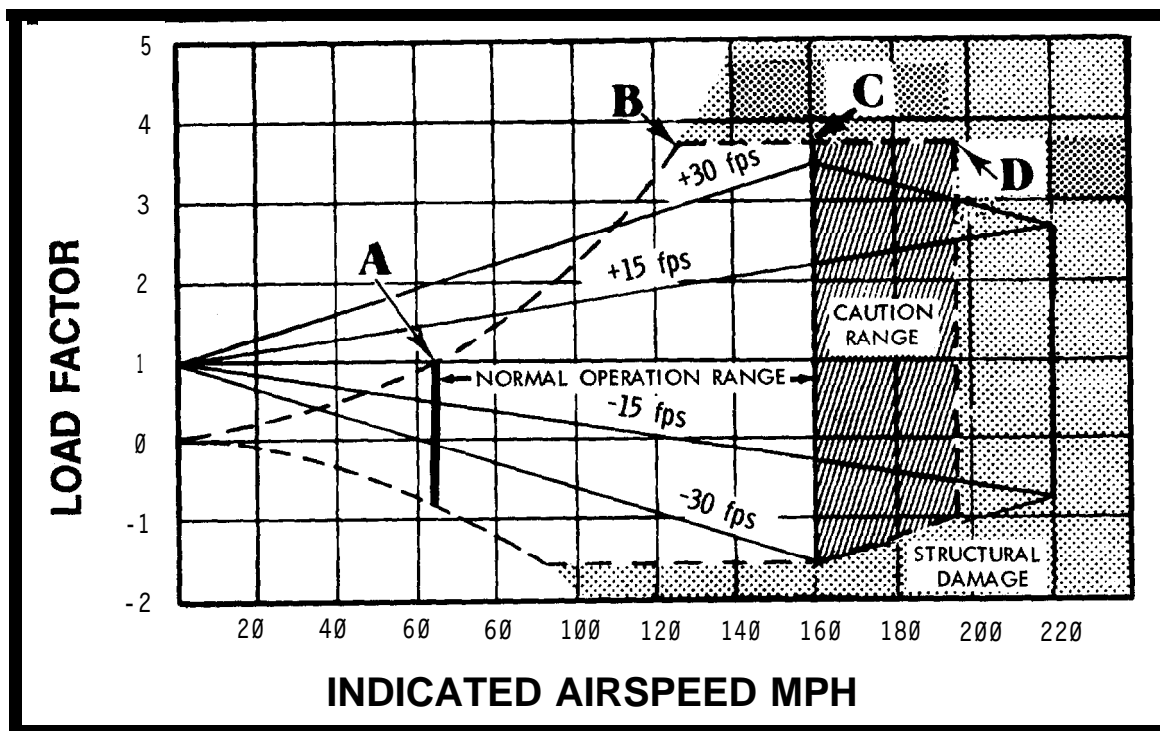


FIGURE 18.—Velocity/Load Factor Chart.

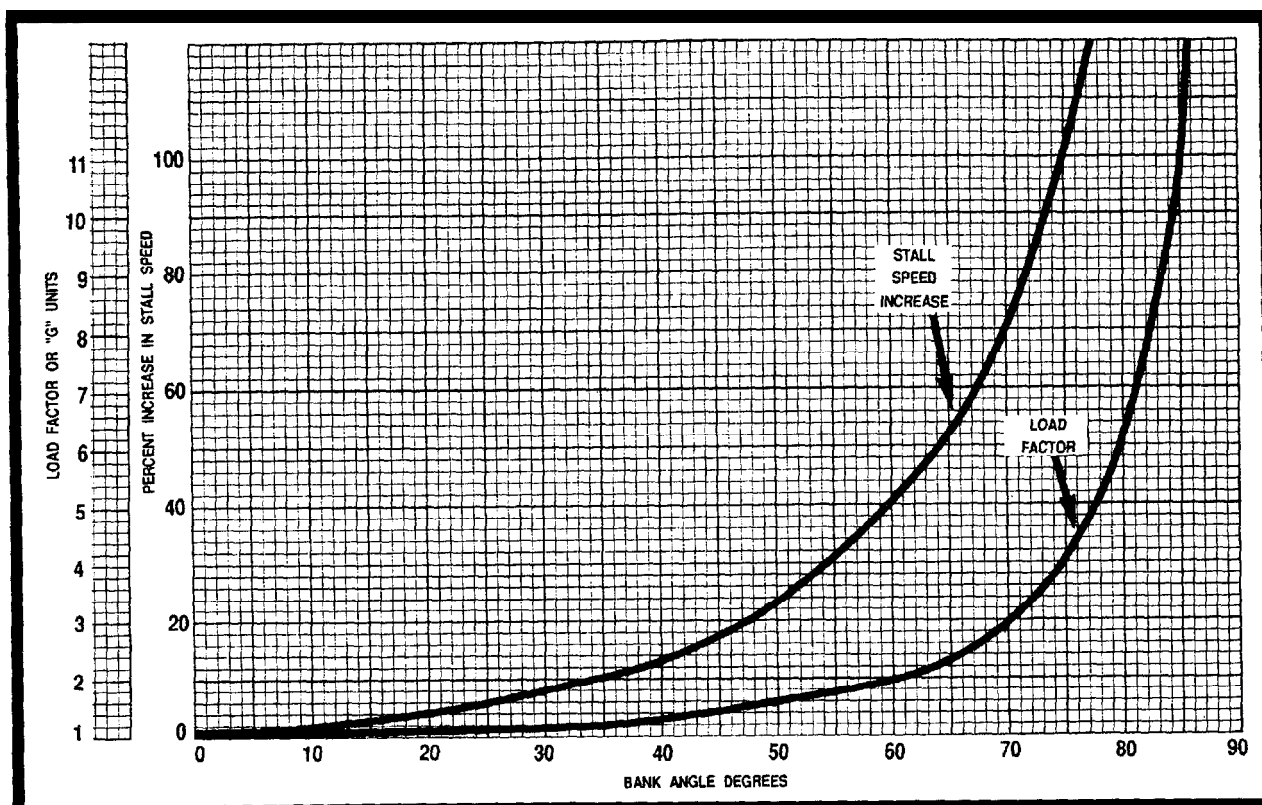


FIGURE 19.—Load Factor/Stall Speed Chart.

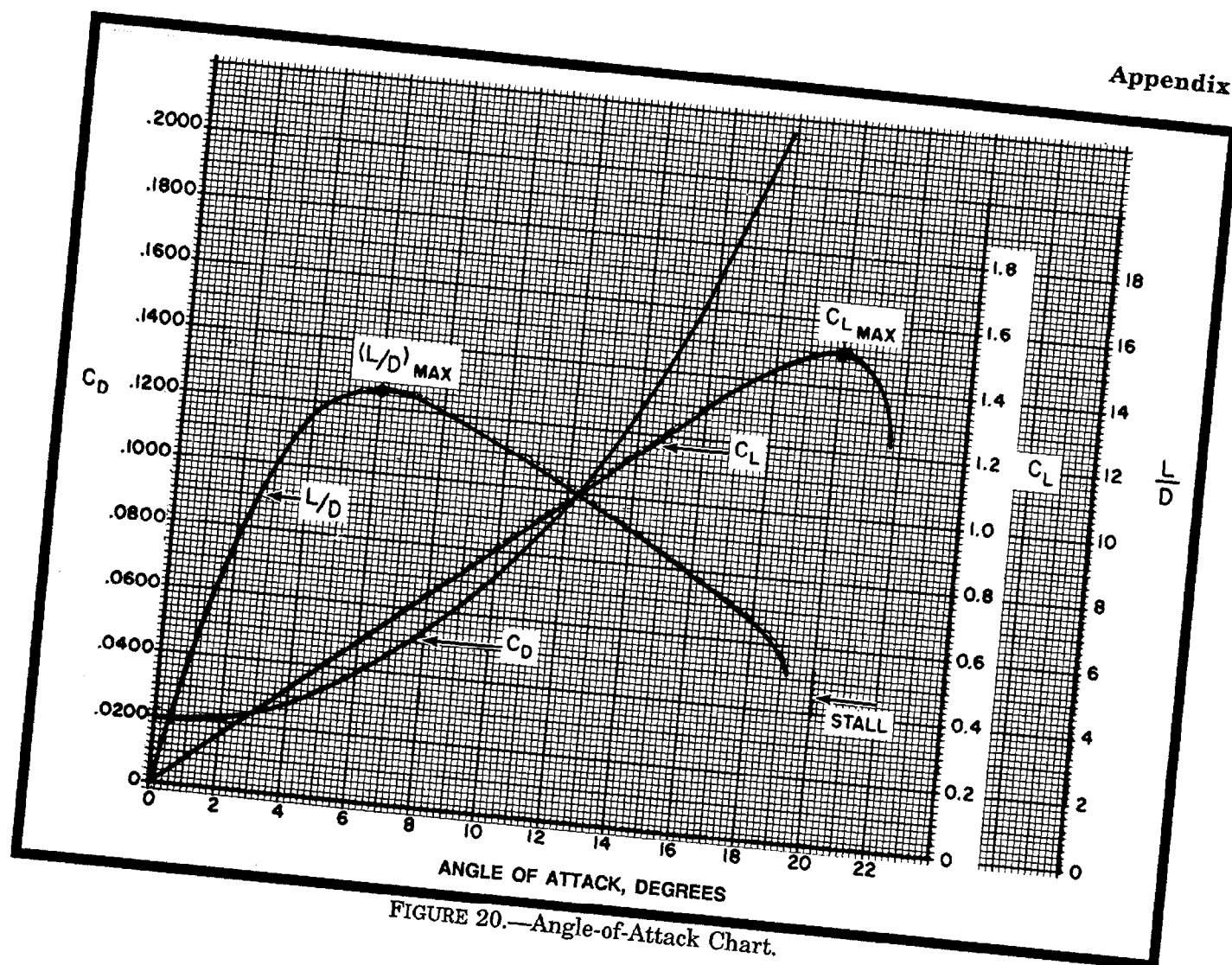


FIGURE 20.—Angle-of-Attack Chart.

Appendix 2

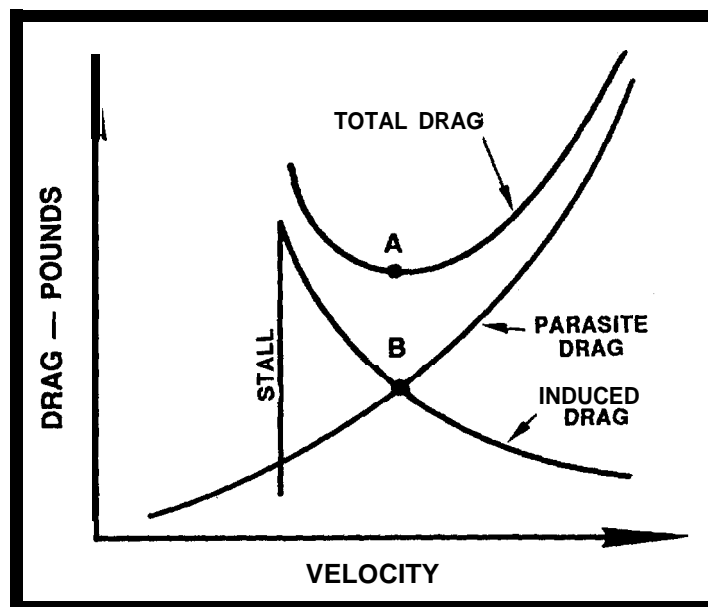


FIGURE 21.—Drag Chart.

<u>AIRCRAFT</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
WING SPAN	40'	35'	48'	30'
AVERAGE WING CHORD	6	5'	6'	6

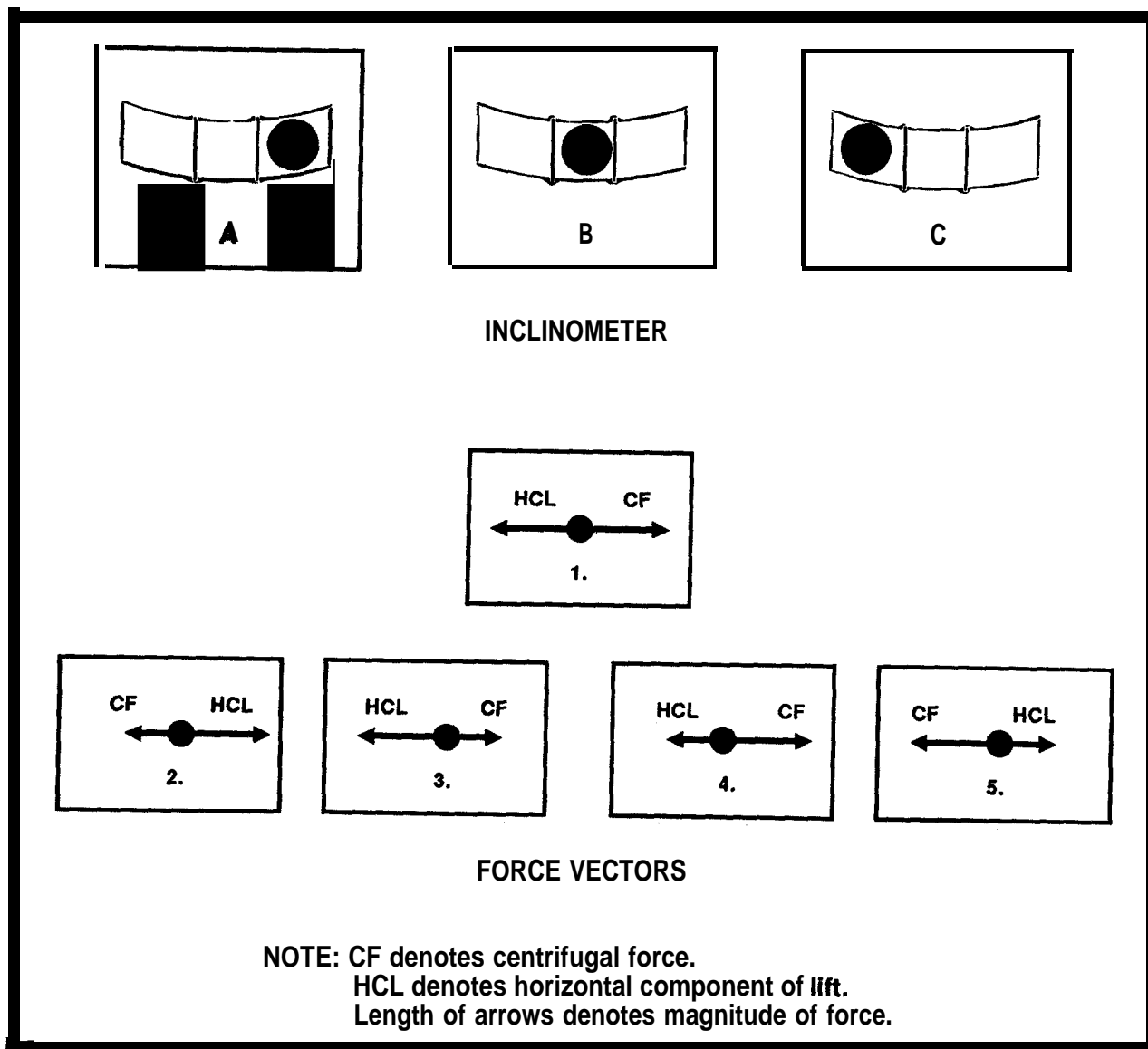


FIGURE 23.—Force Vectors.

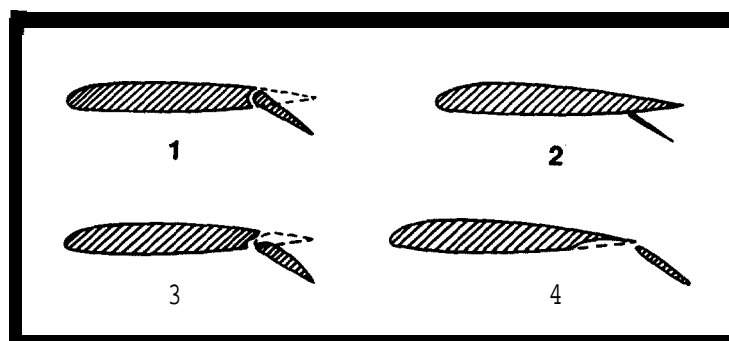


FIGURE 24.-Wing Flap Diagrams.

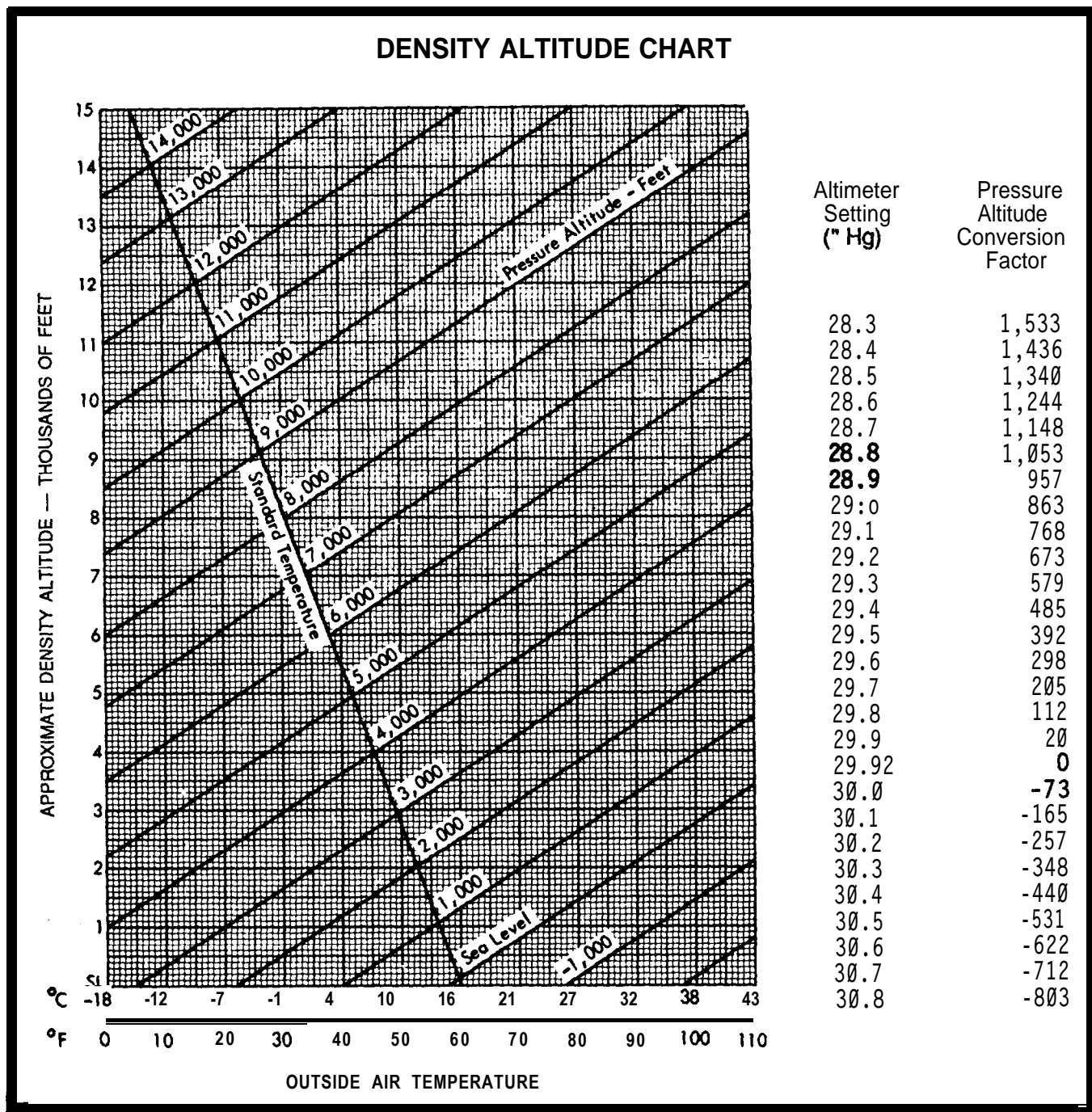



FIGURE 25.-Density Altitude Chart.

AIRSPEED CORRECTION TABLE					
Flaps 0°		Flaps 15°*		Flaps 45°**	
IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH	IAS, MPH	CAS, MPH
80	84	70	79	70	76
100	102	80	86	80	84
120	122	90	94	90	93
140	141	100	103	100	102
160	161	110	112	110	111
180	181	120	121	120	120
200	201	130	131	130	129
220	221	140	141	140	138
240	242	150	151		
		160	161		
*Maximum Flap Speed 160 MPH			**Maximum Flap Speed 140 MPH		
NOTE: CAS IS IDENTICAL TO TIAS					
STALL SPEED CHART					
MPH-CAS					
4990 POUNDS GROSS WEIGHT					
CONFIGURATION	ANGLE OF BANK				
	0°	20°	40°	60°	
Gear and Flaps Up	84	87	97	119	
Gear Down and Flaps 15°	80	83	92	113	
Gear Down and Flaps 45°	76	79	87	108	

FIGURE 26.—Airspeed/Stall Speed Chart.

TAKEOFF DATA

TAKEOFF DISTANCE WITH 20° FLAPS FROM HARD-SURFACED RUNWAY



GROSS WEIGHT LB	IAS AT 50 FT MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F		AT 2500 FEET & 50°F		AT 5000 FT & 41°F		AT 7500 FT & 32°F	
			GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE
2200	55	0	345	680	405	770	480		580	
		15	205	460	245	525	295	885	365	1140
		30	100	275	120	320	155	615	195	460
2600	60	0	500	915	585	1045	705	1230	855	1470
		15	310	635	370	735	455	870	560	1055
		30	165	395	200	465	255	565	325	695
3000	64	0	695	1210	820	1405	990	1675	1205	2045
		15	450	855	535	1005	660	1215	815	1505
		30	250	555	310	665	390	820	500	1030

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

FIGURE 27.—Takeoff Data Chart.

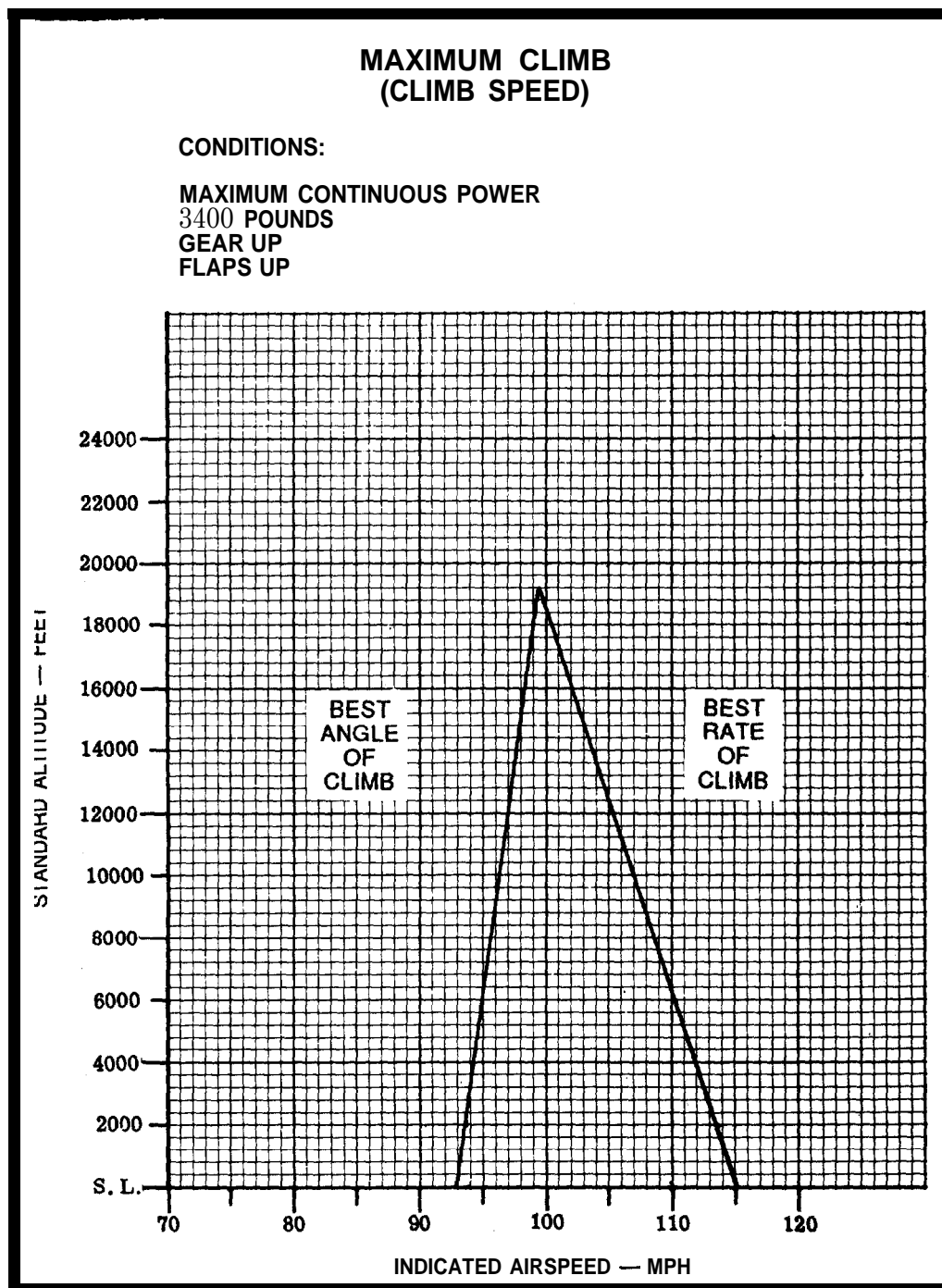


FIGURE 28.—Maximum Climb Chart.

MAXIMUM PERFORMANCE TAKEOFF DISTANCE

CONDITIONS:

1. Power - FULL THROTTLE and 2700 RPM before releasing brakes.
2. Mixtures — LEAN for field elevation.
3. Cowl Haps — OPEN.
4. Wing flaps — UP.
5. Level, dry, hard-surface runway.

NOTE:

1. Increase total distance 8 percent for operation on dry, sod runway.
2. Decrease total distance 7 percent for each 10 knots of headwind.
3. Increase total distance 5 percent for each 2 knots of tailwind.

WEIGHT- POUNDS	TAKEOFF TO 50- FOOT OBSTACLE SPEED- KIAS	PRESSURE ALTITUDE- FEET	20°C (68°F)		30°C (86°F)		40°C (104°F)	
			GROUND ROLL - FEET	TOTAL DISTANCE TO CLEAR 50 FEET	GROUND ROLL - FEET	TOTAL DISTANCE TO CLEAR 50 FEET	GROUND ROLL - FEET	TOTAL DISTANCE TO CLEAR 50 FEET
5500	82	Sea Level	1390	1760	1490	1890	1590	2020
		1000	1530	1950	1640	2080	1760	2230
		2000	1680	2150	1810	2300	1940	2470
		3000	1860	2380	2000	2550	2150	2750
		4000	2060	2650	2220	2850	2380	3070
		5000	2280	2950	2460	3190	2640	3450
		6000	2530	3310	2730	3590	2950	3900
		7000	2830	3750	3160	4190	3410	4570
		8000	3280	4420	3540	4840	3830	5330
		9000	3810	5170	4100	5730	4330	6130
		10,000	4150	5170	4500	5730	4330	6420
5100	78	Sea Level	1160	1470	1240	1570	1330	1680
		1000	1400	1620	1370	1730	1470	1850
		2000	1550	1780	1500	1910	1610	2040
		3000	1760	1960	1660	2100	1780	2260
		4000	1710	2180	1840	2340	1970	2510
		5000	1890	2410	2030	2590	2180	2790
		6000	2090	2690	2250	2890	2420	3120
		7000	2330	3010	2510	3250	2700	3520
		8000	2600	3400	2800	3690	3030	4010
		9000	2920	3890	3270	4360	3530	4760
		10,000	3390	4580	3660	5030	3960	5560
4700	75	Sea Level	960	1220	1020	1300	1090	1380
		1000	1050	1340	1120	1430	1200	1520
		2000	1150	1460	1230	1560	1320	1670
		3000	1270	1610	1360	1720	1460	1840
		4000	1400	1770	1500	1900	1610	2030
		5000	1540	1960	1650	2100	1780	2250
		6000	1700	2170	1830	2330	1970	2500
		7000	1890	2410	2030	2590	2190	2790
		8000	2100	2700	2260	2910	2440	3140
		9000	2350	3040	2540	3290	2730	3570
		10,000	2620	3430	2830	3730	3060	4060

FIGURE BY.-Maximum Performance Takeoff Chart.

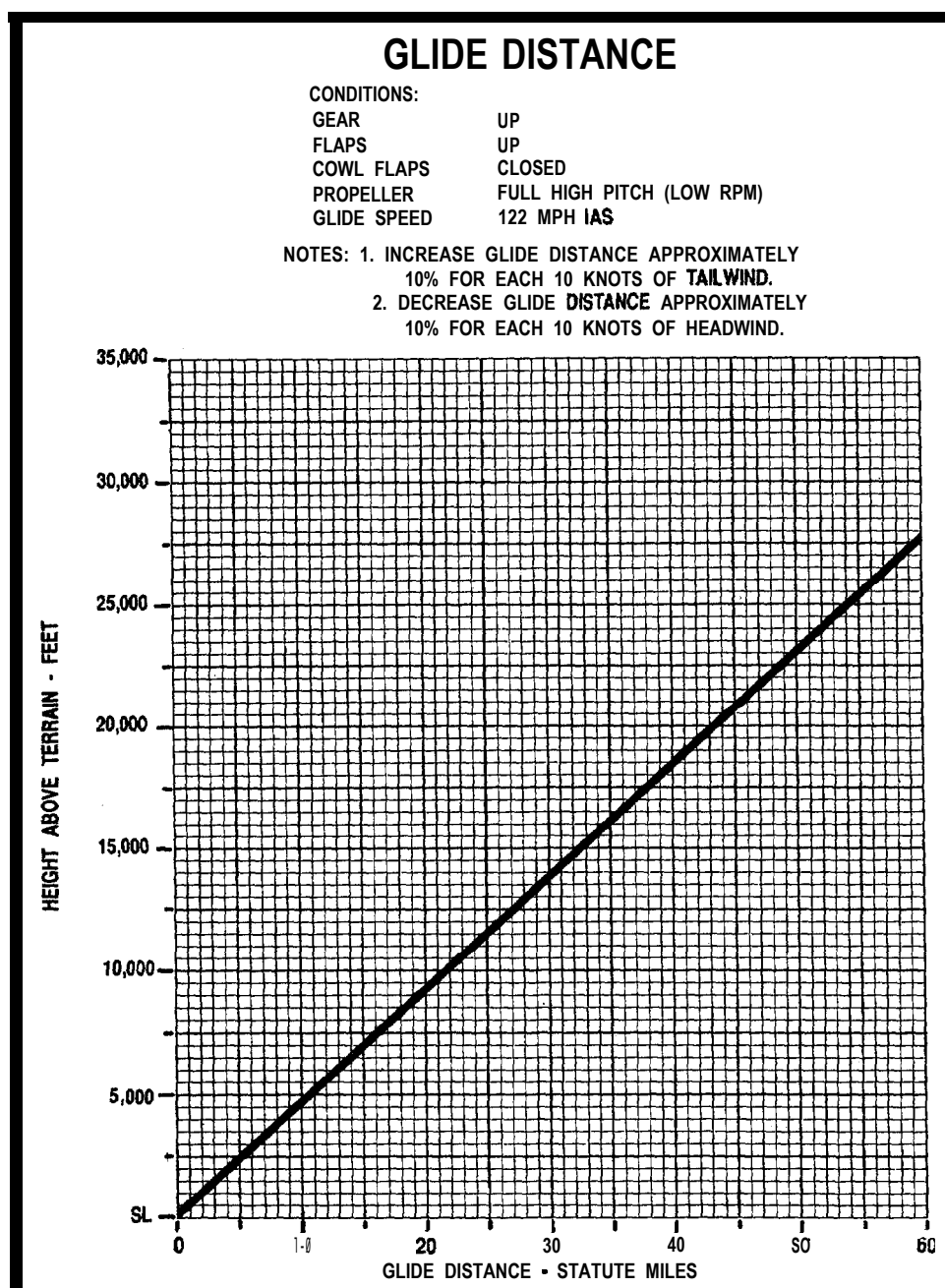


FIGURE 30.—Glide Distance Chart.

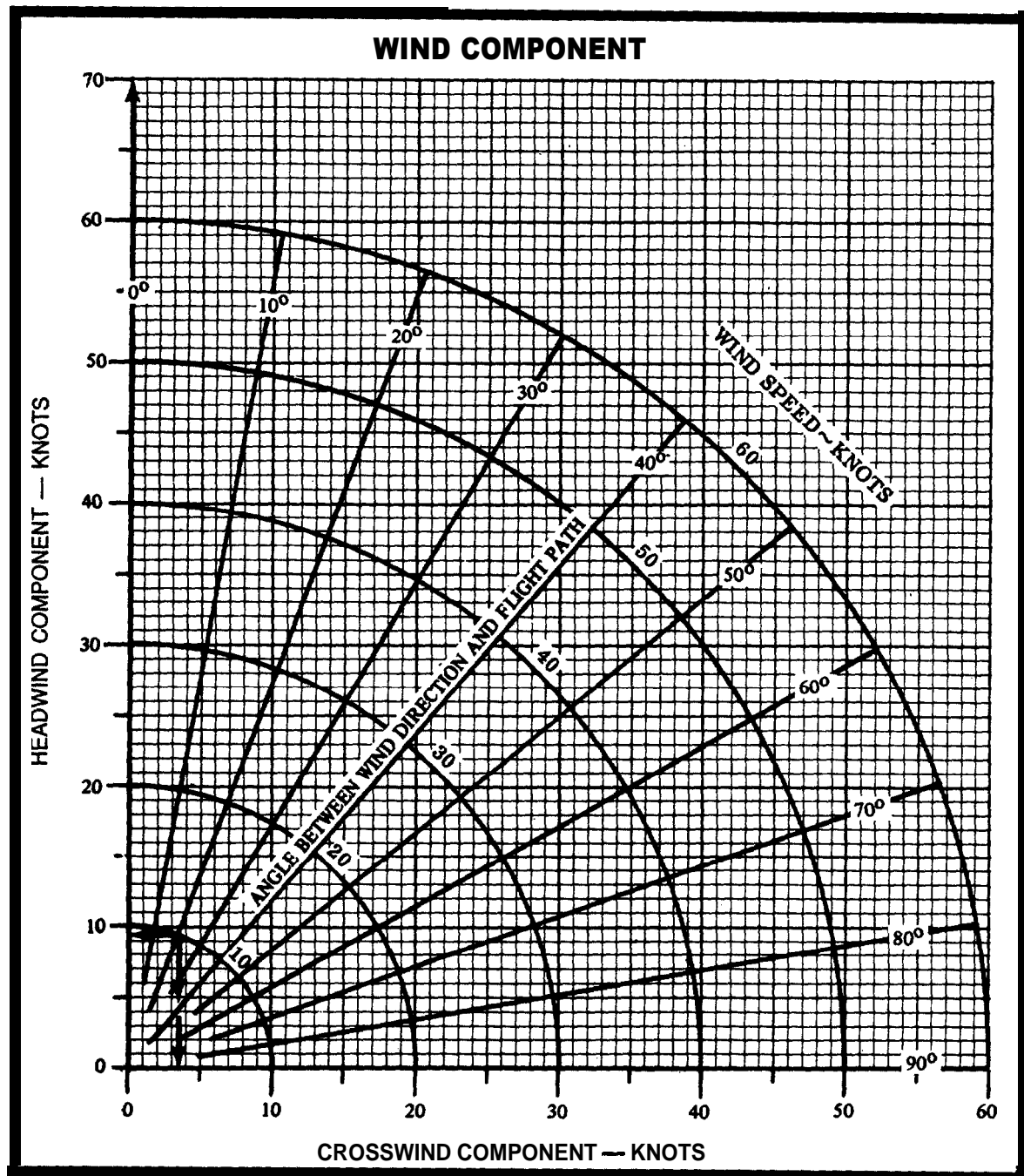


FIGURE 31.—Wind Component Chart.

Appendix 2

NORMAL LANDING

CONDITIONS:

POWER AS REQUIRED TO
MAINTAIN 800 FT/MIN
DESCENT ON APPROACH
FLAPS DOWN
RUNWAY PAVED, LEVEL,
DRY SURFACE
APPROACH SPEED IAS AS TABULATED

EXAMPLE:

OAT 75 °F
PRESSURE ALTITUDE 4000 FT
LANDING WEIGHT 3200 LB
HEADWIND 10 KTS
TOTAL LANDING DISTANCE
OVER A 50 FT OBSTACLE 1475 FT
GROUND ROLL (53% OF 1475) 782 FT
IAS APPROACH SPEED 87 MPH IAS

NOTE: GROUNDROLL IS APPROX. 53%
OF TOTAL LANDING DISTANCE
OVER A 50 FT OBSTACLE.

WEIGHT POUNDS	IAS APPROACH SPEED (ASSUMES ZERO INSTR. ERROR)	
	MPH	KNOTS
3400	90	78
3200	87	76
3000	84	73
2800	81	70
2600	78	68
2400	75	65

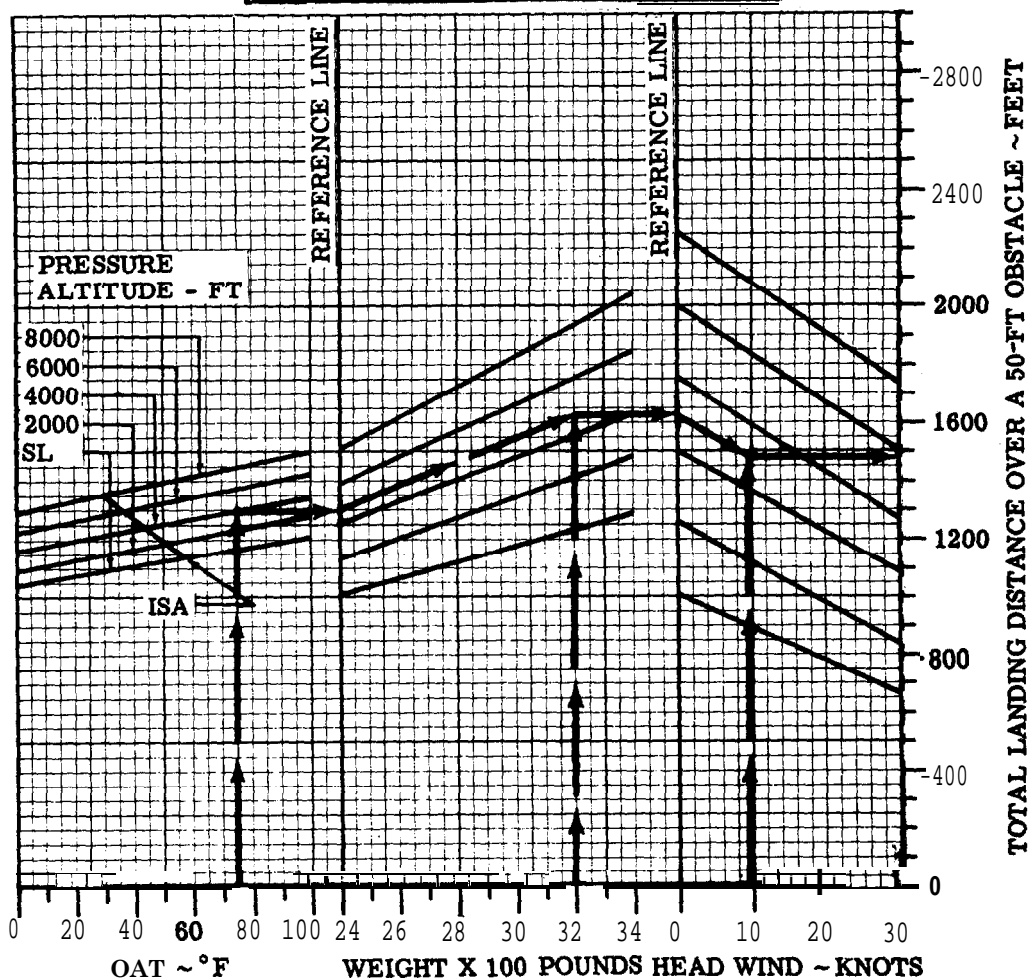


FIGURE 32.—Normal Landing Chart.

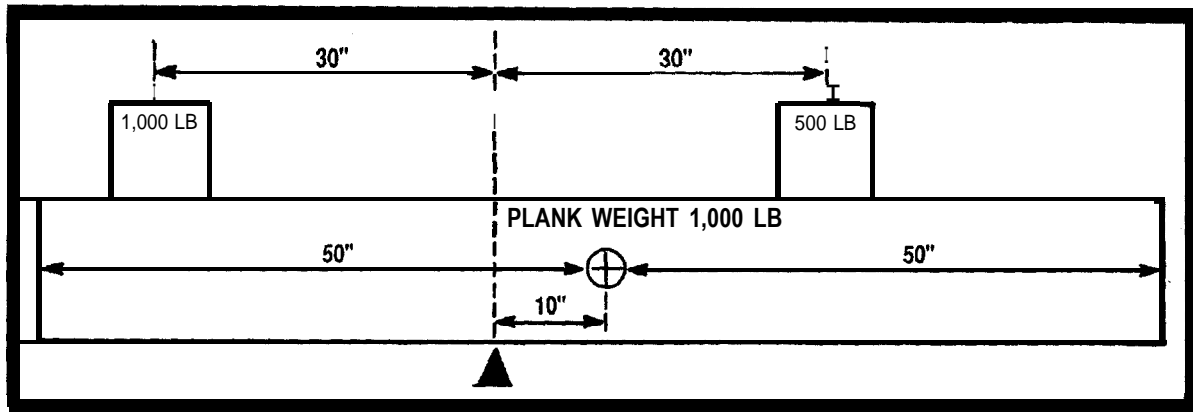


FIGURE 33.-Weight and Balance Diagram.

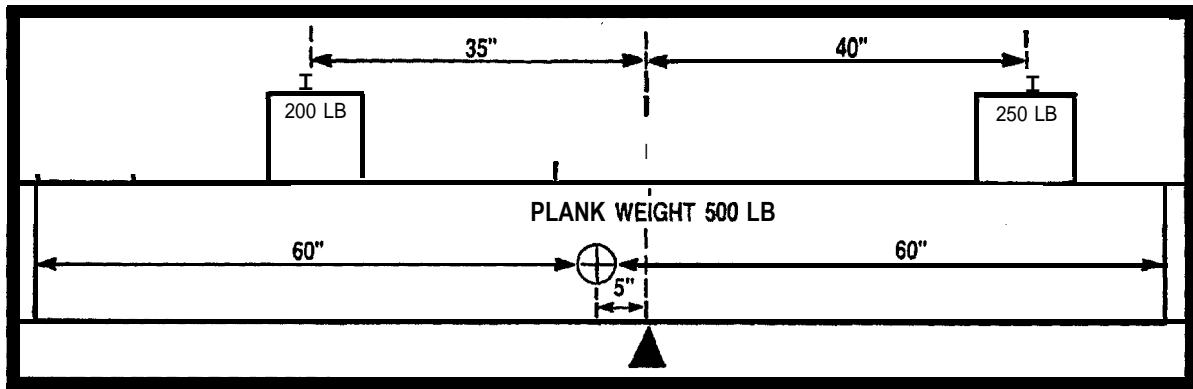


FIGURE 34.-Weight and Balance Diagram.

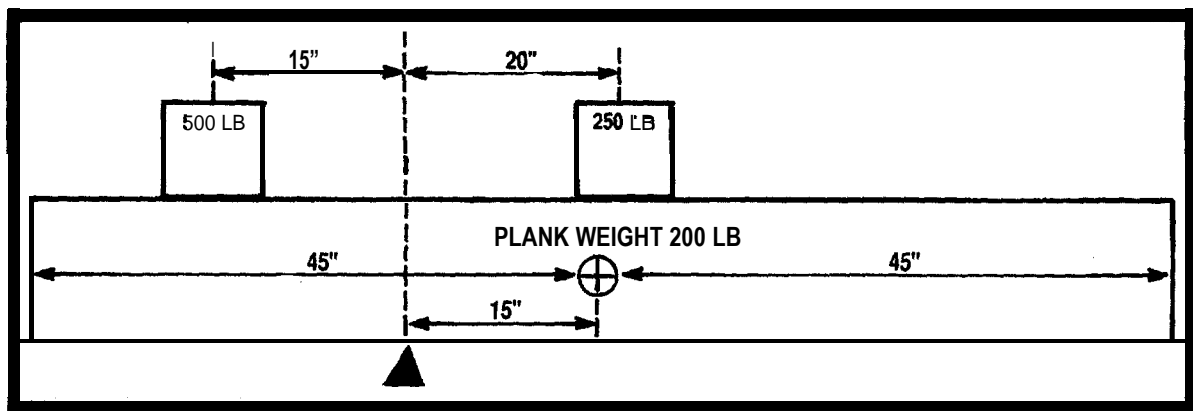


FIGURE 35.—Weight and Balance Diagram.

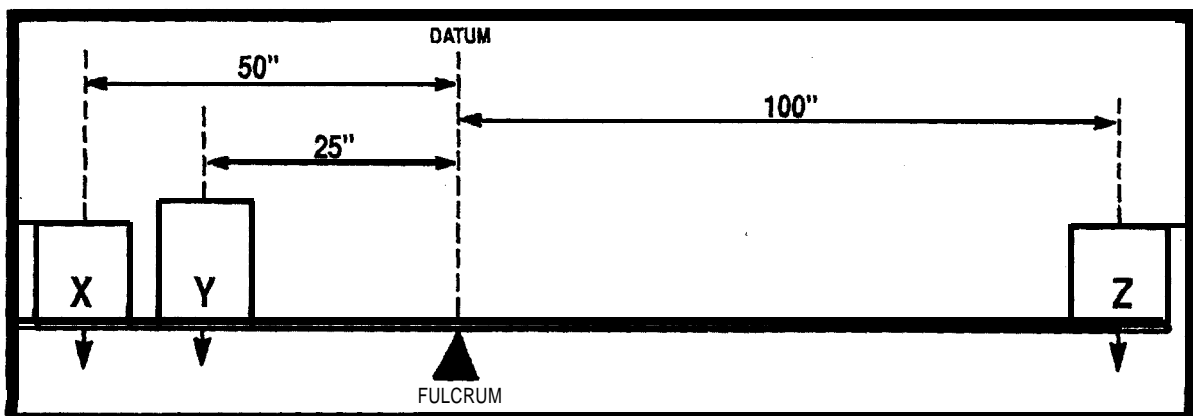


FIGURE 36.—Weight and Balance Diagram.

Appendix 2

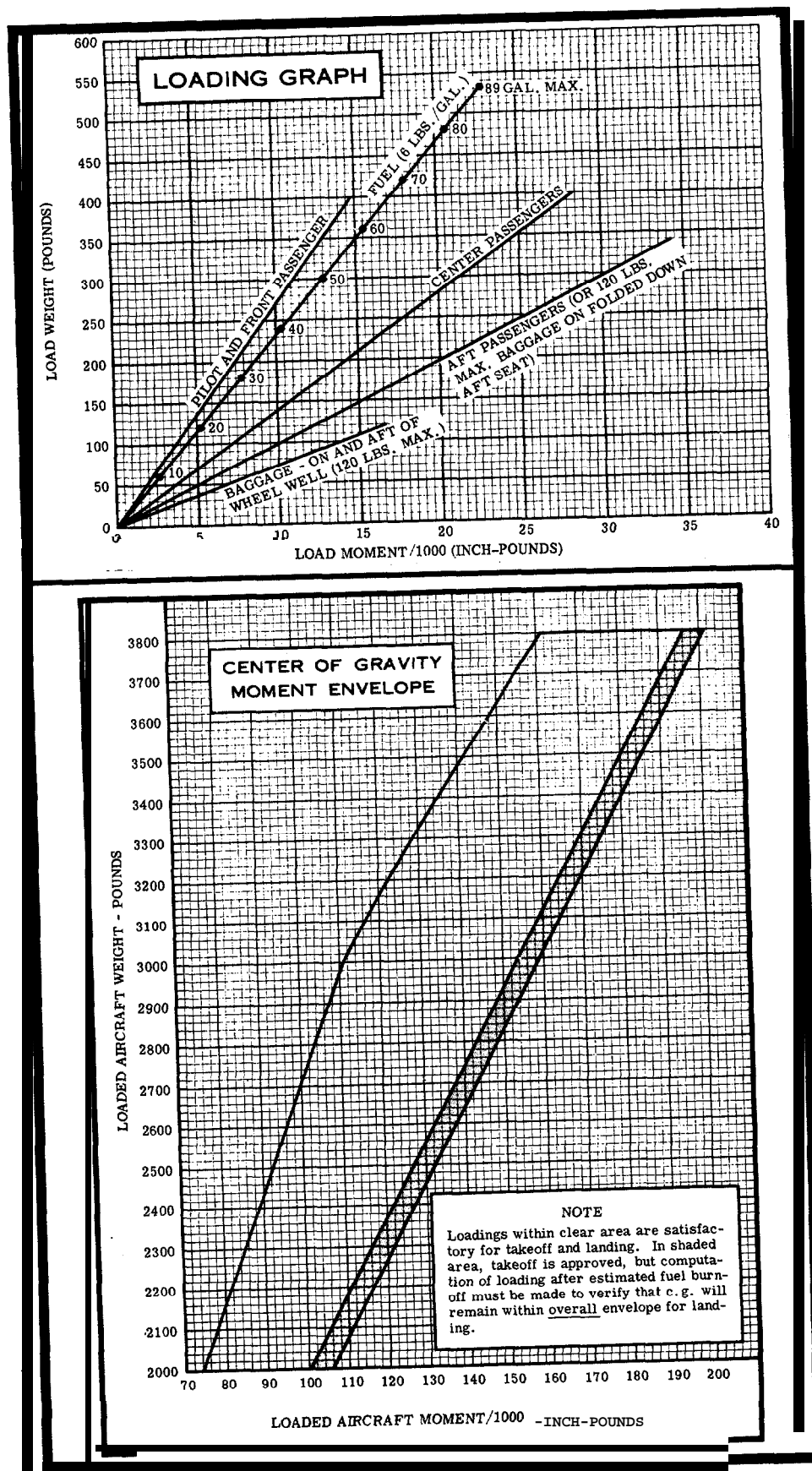


FIGURE 37.-Weight and Balance Chart.

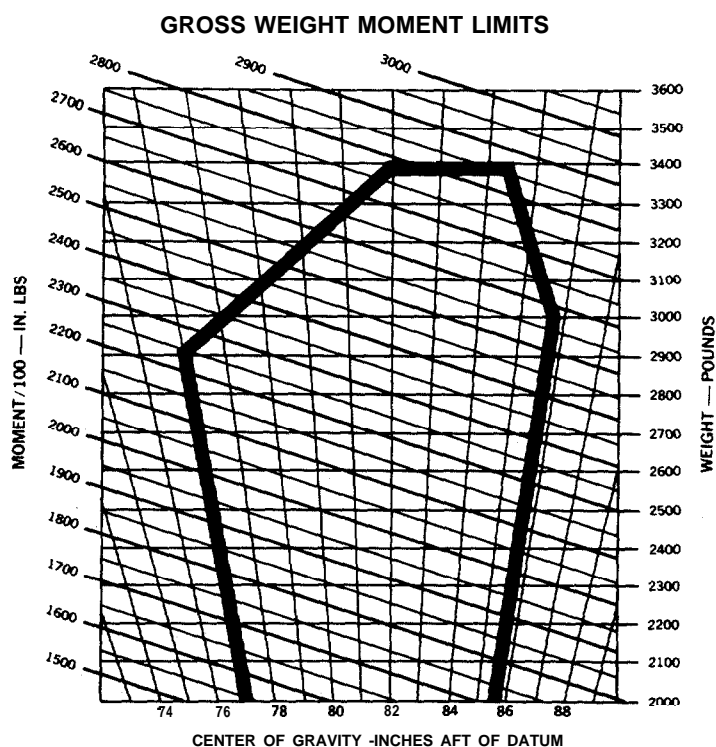
USEFUL LOAD WEIGHTS AND MOMENTS

EMPTY WEIGHT DATA		
*Oil is included in empty weight	Empty Weight (Lbs.)	Empty Weight Moment (/100)
	Certificated Weight	
	2110	1652

FUEL					
ARM 75					
Gallons	Weight	Moment	Gallons	Weight	Moment
5	30	23	45	270	203
10	60	45	49	294	221
15	90	68	55	330	248
20	120	90	60	360	270
25	150	113	65	390	293
30	180	135	70	420	315
35	210	158	75	450	338
40	240	180	80	480	360

OCCUPANTS				
Front Seats		Rear Seats		
ARM 85			Fwd. Position ARM 121	Aft Position ARM 136
Weight	Moment	Weight	Moment	Moment
120	102	120	145	163
130	111	130	157	177
140	119	140	169	190
150	128	150	182	204
160	136	160	194	218
170	145	170	206	231
180	153	180	218	245
190	162	190	230	258
200	170	200	242	273

BAGGAGE	
ARM 150	
Weight	Moment
10	15
20	30
30	45
40	60
50	75
60	90
70	105
80	120
90	135
100	150
110	165
120	180
130	195
140	210
150	225
160	240
170	255
180	270
190	285
200	300
210	315
220	330
230	345
240	360
250	375
260	390
270	405



NOTE: All moments are equal to

$$\frac{\text{weight} \times \text{arm}}{100}$$

FIGURE 38. Weight and Balance Chart,.

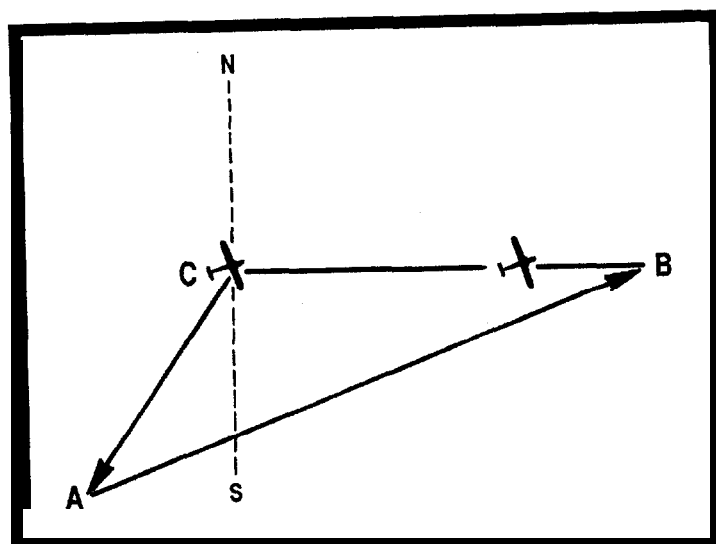


FIGURE 39.—Wind Triangle.

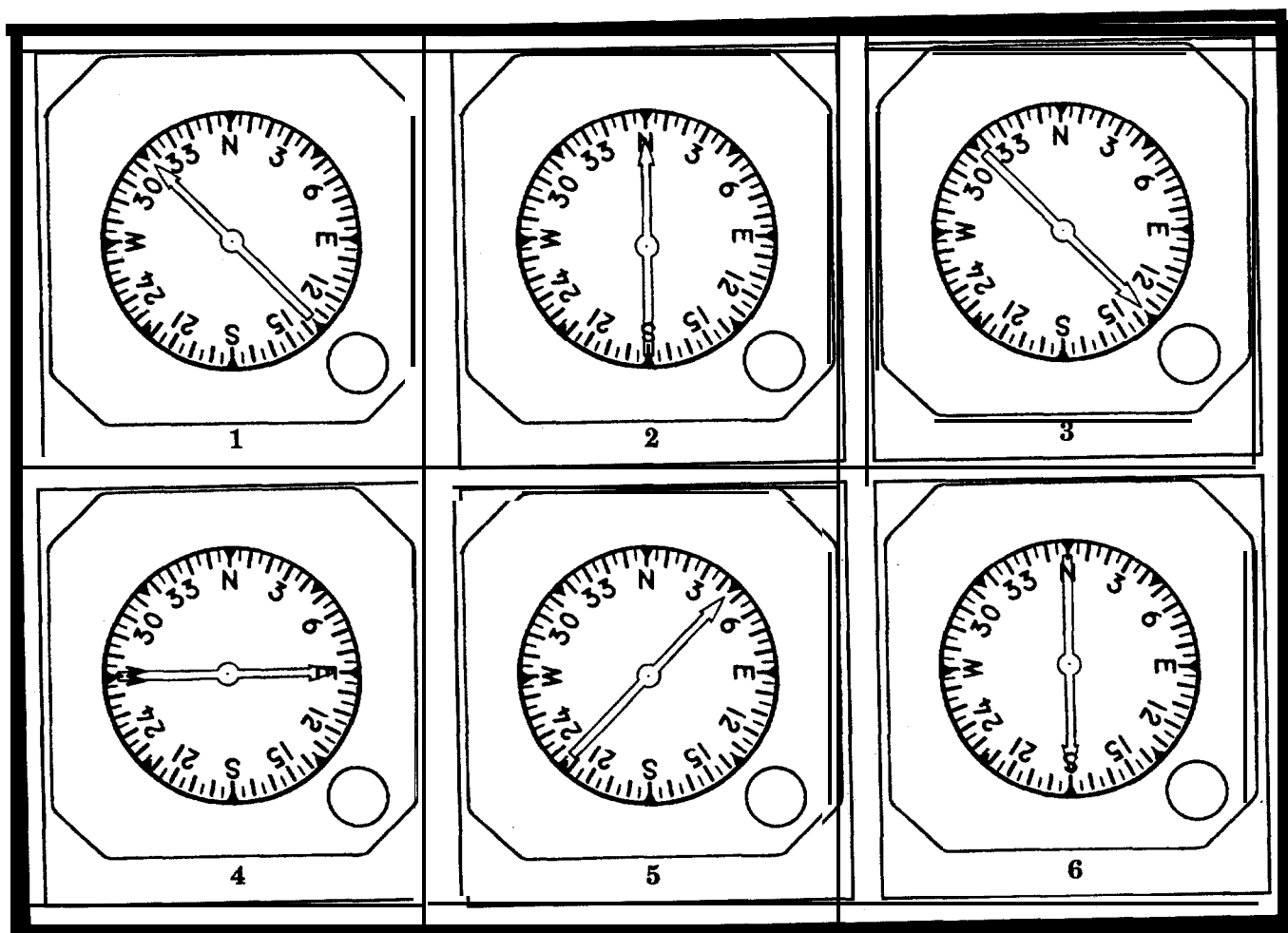


FIGURE 40.—ADF Indicators (Fixed-Dial).

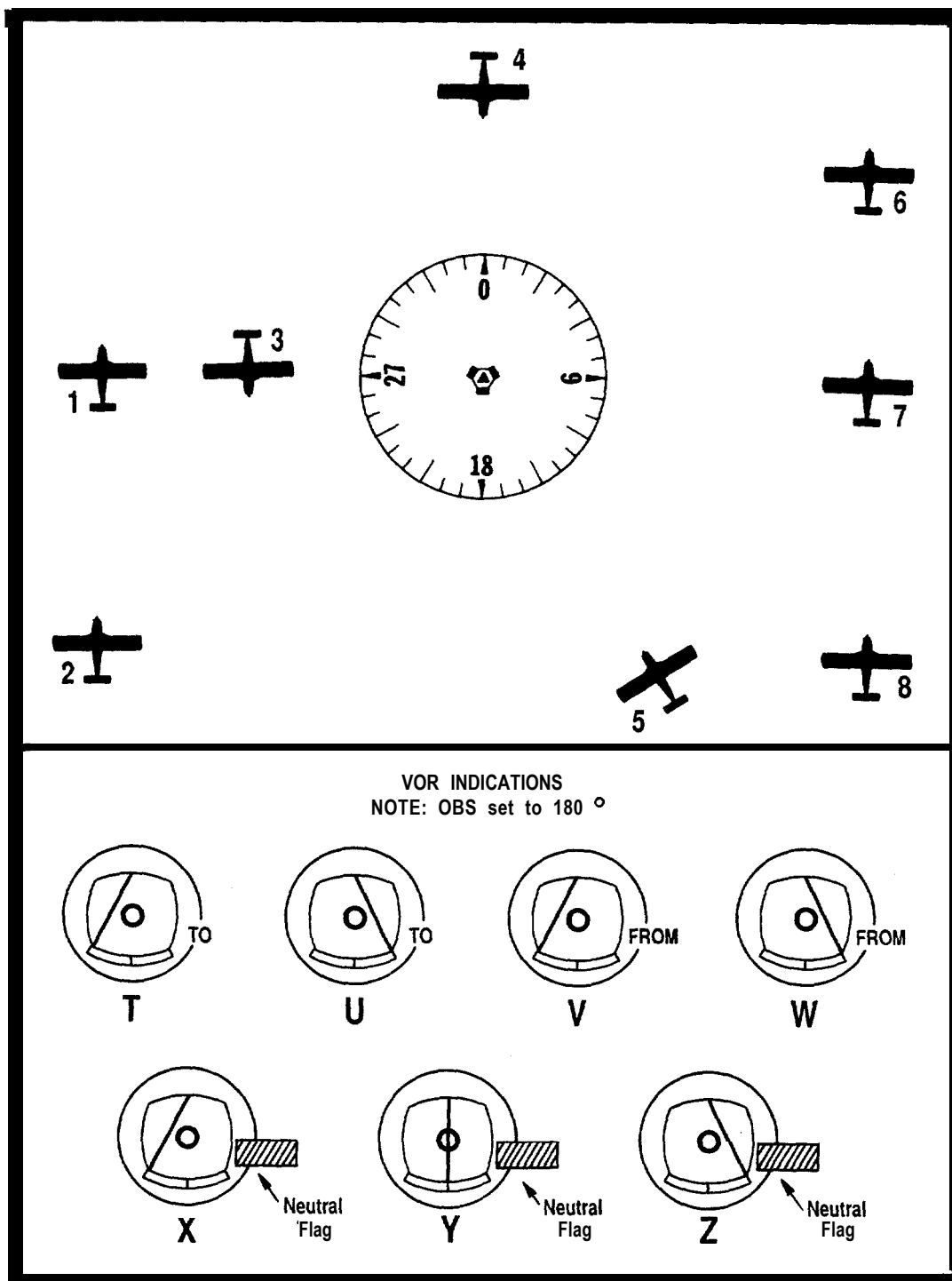


FIGURE 41.—VOR Indications.

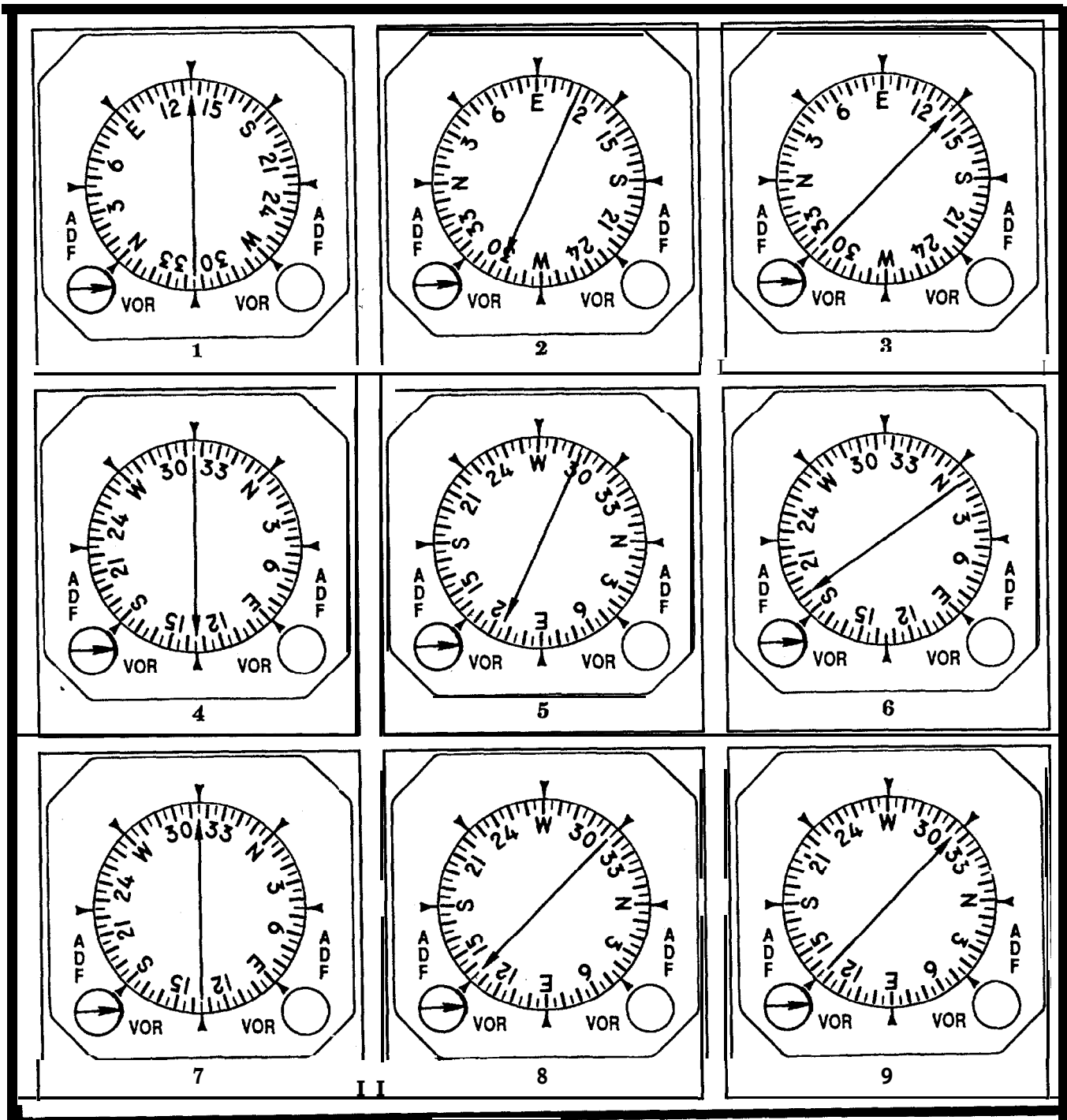


FIGURE 42.—RMI Indicators.

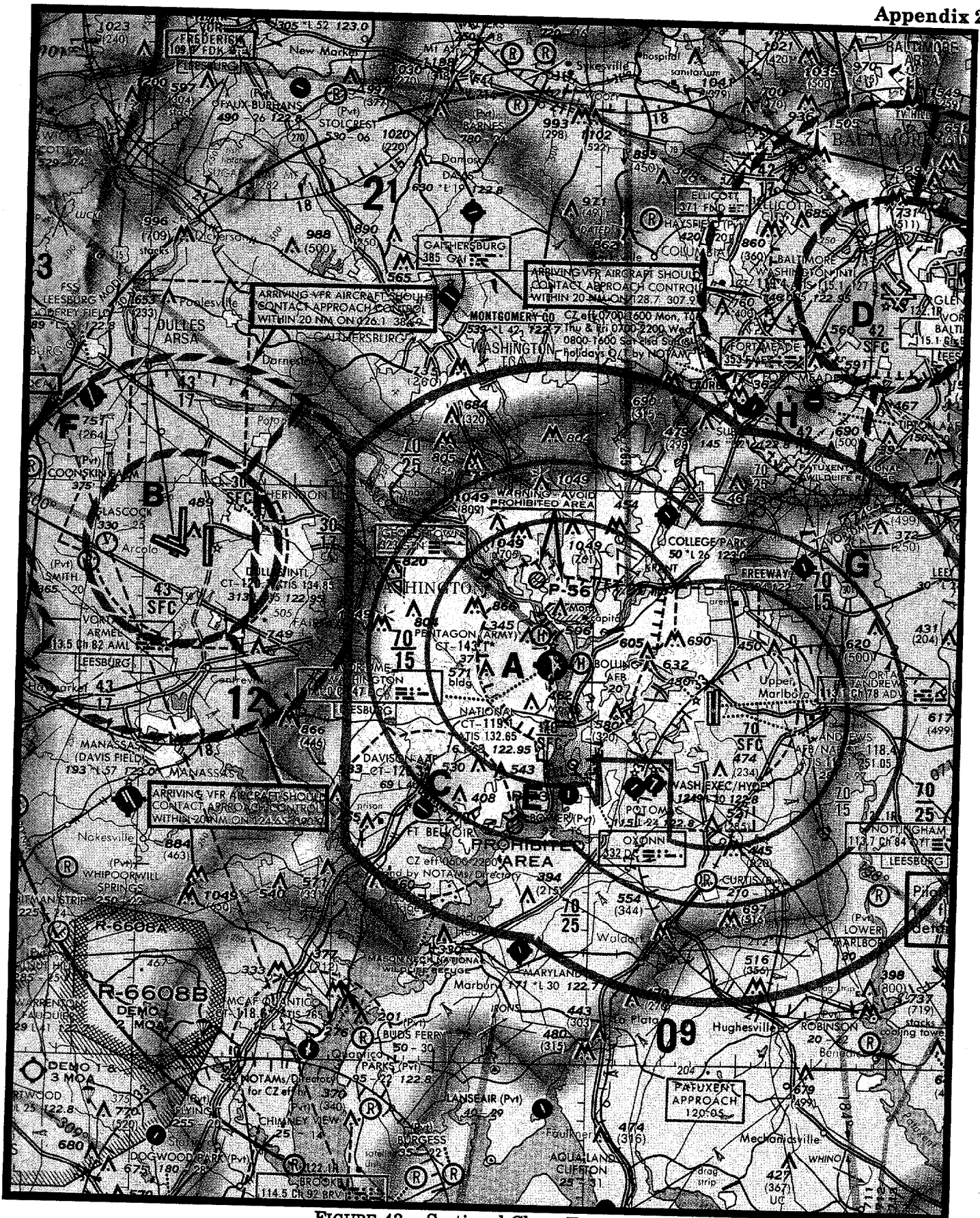


FIGURE 43.—Sectional Chart Excerpt.

Appendix 2

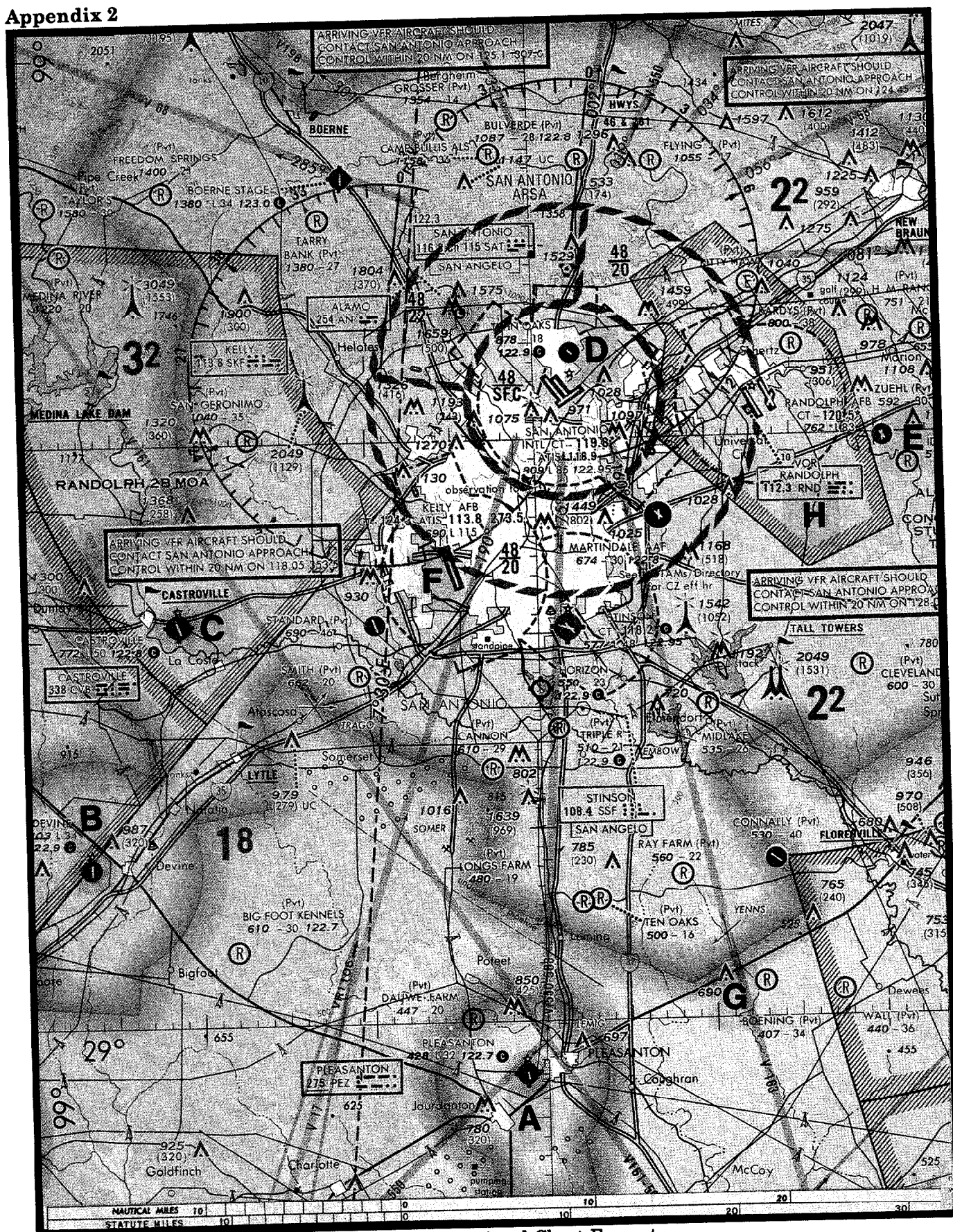
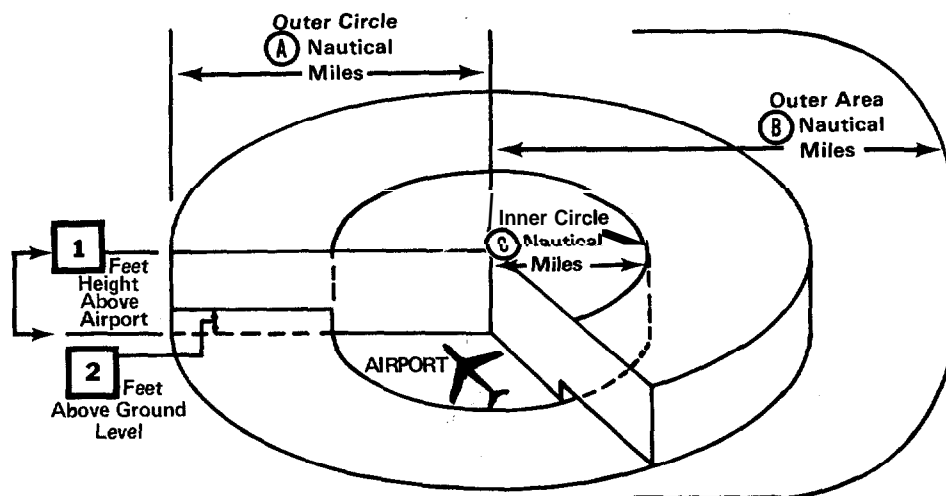


FIGURE 44.—Sectional Chart Excerpt.



FIGURE 45.—Sectional Chart Excerpt.

Airport Radar Service Area (ARSA)



Services upon establishing two-way radio communication and radar contact:

- Sequencing Arrivals
- IFR/IFR Standard Separation
- IFR/VFR Traffic Advisories and Conflict Resolution
- VFR/VFR Traffic Advisories

IFR: Instrument Flight Rules
VFR: Visual Flight Rules

FIGURE 46.—Airport Radar Service Area Diagram.

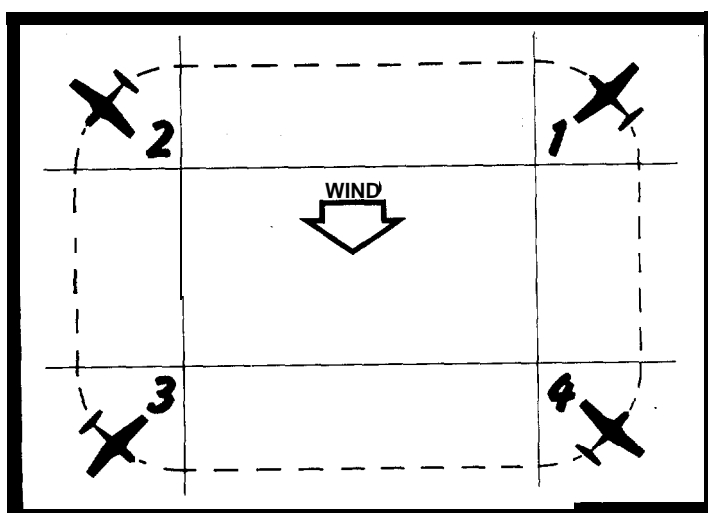


FIGURE 47.—Rectangular Course.

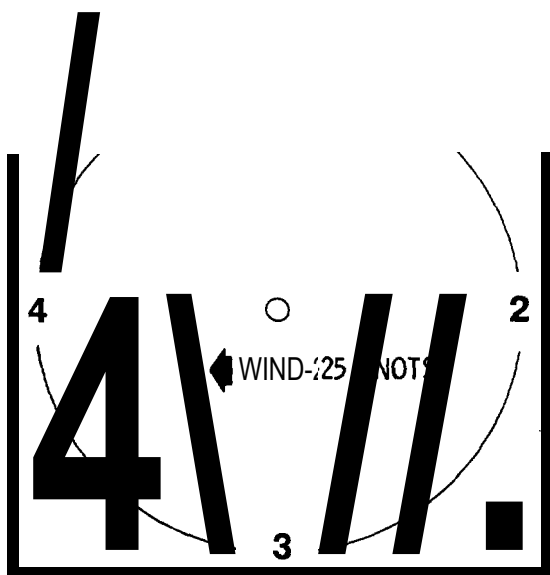


FIGURE 48.—Turn Around a Point Diagram.

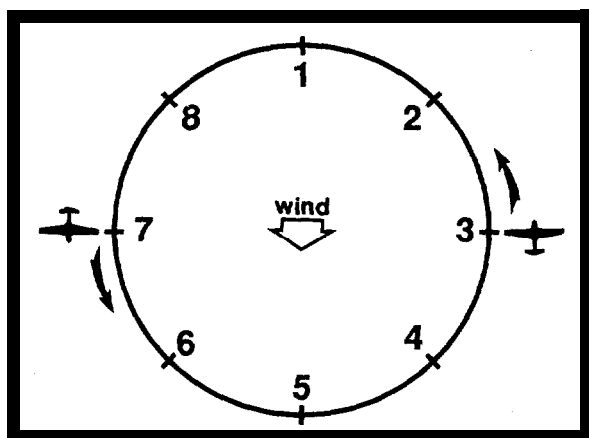


FIGURE 49.—Ground Track Diagram.

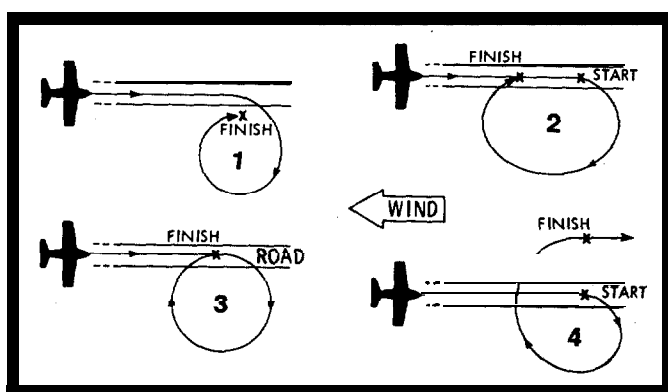


FIGURE 50.—Ground Track Diagram.

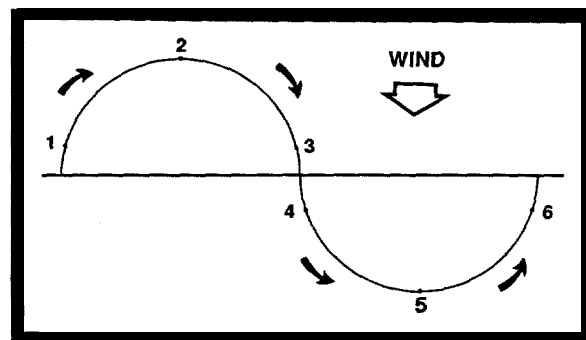


FIGURE 51.—S-Turn Diagram.

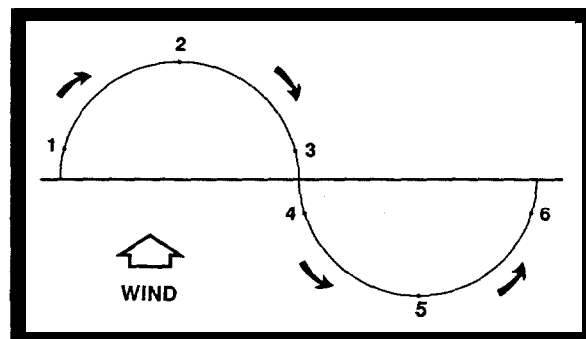


FIGURE 52.—S-Turn Diagram.

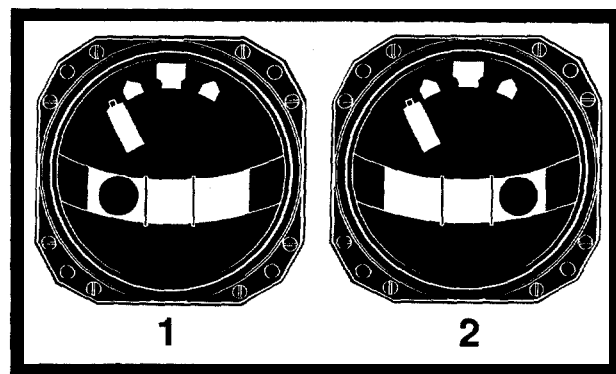


FIGURE 53.—Turn-and-Slip Indicator.

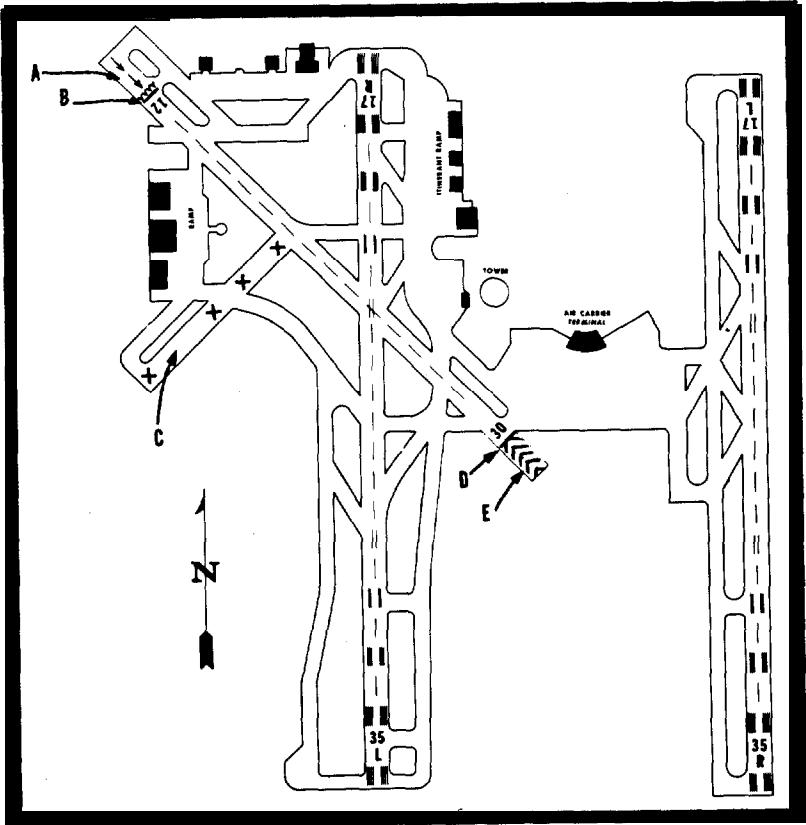


FIGURE 54.—Airport Diagram.

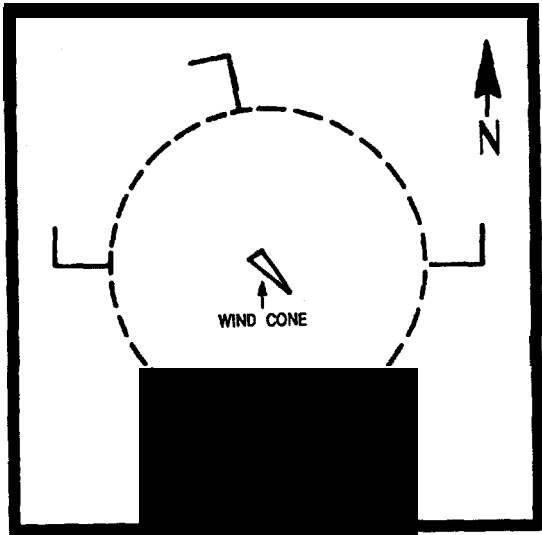


FIGURE 55.Traffic Pattern Indicator.

TEXAS

§ DALLAS LOVE FLD (DAL) 5 NW UTC-6(-5DT) 32°50'49"N 96°51'05"W		DALLAS-FT. WORTH
487 B S4 FUEL 100LL, JET A		H-2K, 4F, 5B, I-13C, A
OX 1, 2, 3, 4 LRA CFR Index C		IAP
RWY 13R-31L: H8800X150 (CONC-GRVD) S-100, D-200, DT-350 HIRL, CL		
RWY 13R: VASI(V4L)—GA 3.0° TCH 53' Thld dspld 490' Tree. Rgt tfc.		
RWY 31L: SSALR. TDZ. Building.		
RWY 13L-31R: H7753X150 (ASPH-GRVD) s-100, D-200, DT-350 HIRL, CL		
RWY 13L: SSALR. TDZ. Pole. RWY 31R: MALSR. VASI(V4L)—GA 3.0° TCH 38' Pole. Rgt tfc.		
RWY 18-36: H6149X150 (ASPH) S-50, D-74, DT-138 HIRL		
RWY 18: VASI(V4L)—GA 3.0° TCH 52' Rgt tfc. RWY 36: VASI(V4L)—GA 3.0° TCH 52' REIL. Tree. Rgt tfc.		
AIRPORT REMARKS: Attended continuously. CAUTION: Birds on and in vicinity of arpt. Ldg Rwy 18 & takeoff Rwy 36 not authorized to acft over 60,000 lbs gross weight unless crosswind NW-SE rwys exceed acft safe operating capability. Rwy 13R-31L 2500' wavy surface from twy T to taxiway D . Noise sensitive areas all quadrants, noise abatement procedures in effect for fixed and rotary wing tfc. for information call arpt manager 2146706610. Taxiway H CLOSED to acft over 110,000 lbs GWT and wingspan greater than 75'. Flight Notification Service (ADCUS) available. Private pilot certificate or better required to takeoff or land, no student solo flights permitted.		
COMMUNICATIONS: MS 120.15 UNICOM 122.95		
FORT WORTH FSS (FTW) TF 1-800-WX-BRIEF. NOTAM FILE DAL.		
① REGIONAL APP CON 125.2 (South) 124.3 (North)		
LOVE TOWER 118.7 GND CON 121.75 CLNC ML 120.0		
① REGIONAL OEP CON 118.55		
ARSA ctc APP CON		
RADIO AIDS TO NAVIGATION: NOTAM FILE DAL.		
LOVE (L) VORW/DME 114.3 LUE Chan 90 32°50'51"N 96°51'42"W at fld. 490/08E		
CONIS NDB (LOM) 275 LV 32°46'29" N 96°46'30" W 311° 5.8 NM to fld.		
ILS 110.3I-DAL Rwy 13L.		
ILS 111.7 I-DPX Rwy 13R.		
ILS 111.7 I-LVF Rwy 31L. LOM CONIS NDB. BC unusable		
ILS 110.3 I-QVW Rwy 31R.		
ASR		
§ REDBIRD (RBD) 6 SW UTC-6(-5DT) 32°40'49"N 96°52'02"W		DALLAS-FT. WORTH
660 B S4 FUEL 100LL, JET A OX 1, 3		H-2K, 4F, 5B, I-13C, 174 A
RWY 11-31: H5452X150 (CONC) S-35, D-60, DT-110 MIRL .3% up NW		IAP
RWY 13: REIL. VASI(V4L)—GA 3.0° TCH 50' Treas.		
RWY 31: LDIN. REIL. VASI(V4L)—GA 3.0° TCH 47' Road.		
RWY 17-35: H3801X150 (CONC) S35, D-60, DT-110 MIRL		
RWY 17: REIL. Tree. RWY 35: REIL.		
AIRPORT REMARKS: Attended 1300-0400Z+. Practice VOR Rwy 13 apch not authorized. When twr closed ACTIVATE LDIN Rwy 31 and VASIRwy 13—120.3. Control Zone effective 1300-0400Z+.		
WEATHER DATA SOURCES: LAWRS		
COMMUNICATIONS: ATIS 126.35 CTAF 120.3 UNICOM 122.95		
FORT WORTH FSS (FTW) TF 1-800-WX-BRIEF. NOTAM FILE RBD.		
① REGIONAL APP CON 123.9 ① REGIONAL DEP an 125.2		
TOWER 120.3 (1300-0400Z+) GND CON 121.7 CLNC DEL 125.45		
RADIO AIDS TO NAVIGATION: NOTAM FILE DFW.		
DALLAS-FT WORTH (H) VORTACW 117.0 DFW Chan 117 32°51'57"N 97°01'40"W 136° 13.8 NM to fld. 560/08E.		
LOVE (L) VORW/DME 114.3 LUE Chan 90 32°50'51"N 96°51'42"W 174° 10.0 NM to fld. 490/08E. NOTAM FILE DAL.		
NDB (MNM) 287 RBD 32°40'37"N 96°52'15"W at fld. NOTAM FILE RBD.		
ILS 108.5 I-RBD Rwy 31. Unmonitored when tower closed.		
DALLAS NORTH (See PLANO)		
DAN E. RICHARDS MUNI (See PADUCAH)		
DAVID HOOKS 30°07'31"N 95°33'57"W NOTAM FILE DWH.		HOUSTON
NDB (MNM) 5 2 1 DWH 164° 3.9 NM to David Wayne Hooks Mem.		I-17B
DAVID WAYNE HOOKS MEM (See HOUSTON)		

FIGURE 56.—Airport/Facility Directory.

